An Investigation on the Limited Innovation Performance in Automotive IJVs in China

By

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University of Warwick *Hao Linghu*

Declaration

This thesis is submitted to the University of Warwick in support of my application for the degree of Doctor of Philosophy. It has been composed by myself and has not been submitted in any previous application for any degree. The work presented (including data generated and data analysis) was carried out by the author.

University of Warwick *Hao Linghu*

Abstract

China has been experiencing constraints to the sustainable development of its domestic economy in recent years due to a reliance on a low value-added oriented economy. The enhancement of innovation among local firms is, therefore, being encouraged by the Chinese government. The Chinese government regards the automotive industry as one of its strategic industries yet the local automotive firms in China still remain relatively under-developed due to a limited independent innovation capacity. Therefore, the enhancement of an indigenous innovation capacity in the automotive industry is badly needed. Favourable policies have been applied in the automotive sector in order to support the technological development of local automotive firms which includes the constraints on foreign direct investment (FDI) in the automotive sector. Automotive multinational corporations (MNCs) are strictly required to establish international joint ventures (IJVs) with local automotive firms and can own no more than a 50% share in an IJV. The logic behind this is to protect the local automotive firms and allow them access to the technological resources of the MNCs and the opportunity for organisational learning. This logic is supported by current literature as IJVs are, arguably, able to deliver innovation outputs through direct access to the resources of the parent companies and the inter-partner learning effects. Despite this, real-life examples suggest a limited innovation performance in the automotive IJVs in China. The innovation achievements are largely limited to minor changes to established products and some new products based on existing technologies. Whilst there is little technological innovation apparent in the automotive IJVs in China, there is evidence of this emerging from local automotive firms without the assistance of an IJV partnership. This PhD thesis explores the underlying reasons for the gap between current academic theory and the reality in the automotive industry. Qualitative case studies of three Chinese automotive IJVs and one independent local automotive firm with a reputation for innovation were conducted to investigate the factors that limit innovation activities in automotive IJVs. The findings of this research suggest that the IJV partnership itself is a constraining factor in the context of the Chinese automotive industry. This is because the nature of automotive IJVs in China lead to a lack of strategic focus on innovation and the IJVs follow a closed innovation paradigm as they only benefit from the limited resources of their parent companies, with little or no access to other external resources. Furthermore, the mismatch of the technological capabilities causes ineffectiveness in the utilisation process of the transferred resources. This research contributes to knowledge by explaining the gap between current theories on IJV and the reality within the industry. Furthermore, a revised model of knowledge management is proposed in the context of IJVs. In light of the main research findings, recommendations are made regarding the policy and practice of using IJV partnerships for the enhancement of innovation capacity among Chinese firms.

Chapter 1: Introduction

1.1. The Development of the Economy and Automotive Industry in China

China's strong economic performance in the last three decades has been witnessed by the world. With an average annual GDP growth of nearly 10%, China overtook Japan and became the world's second largest economy in 2011 (Zhou, 2014). This rapid economic growth started in 1978 when Deng Xiaoping (the former leader of China) officially introduced the 'Open and Reform' policy, which transformed the planned economy into a western market-directed economy (Chang and Halliday, 2005). Yet, it must be recognised that the market economy in China was termed as 'communism with Chinese characteristics' (Goodall et al., 2004), which represents a hybrid between a market-oriented economy and a planned economy, with heavy government control and political direction across the markets as well as in industries. There is evidence that the central government of China is still effectively influencing the domestic economy and key industries such as the automotive industry (Harrison, 2001).

Figure 1 gives an overview of the growth of the Chinese economy and the automotive industry. It should be highlighted that the growth rate of both the automotive industry and domestic economy as a whole has been consistently higher than other developed countries. Taking Japan for comparison, the Japanese economy has only achieved in average less than 1% annual growth in the last decade while China has achieved circa 7% (World Bank Statistics, 2017).

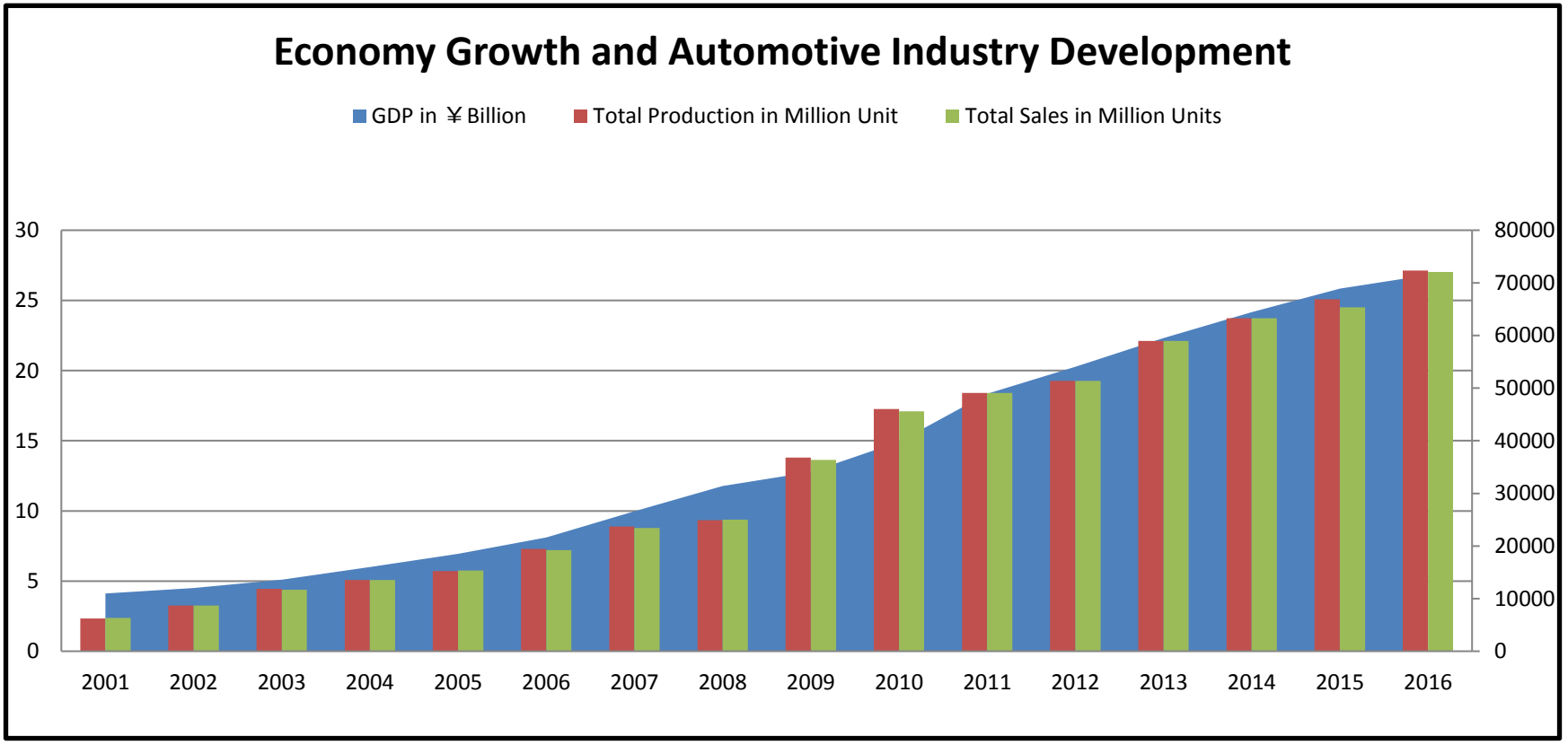


Figure 1.1: Economy Growth and Automotive Industry Development in China

Data Source: National Bureau of Statistics of the People's Republic of China (NBSPRC) Data Base (Available at http://www.stats.gov.cn/tjsj/)

As a result of the rapid economic growth in China, there has been a substantial increase in the size of the middle class (Barton et al., 2013). The middle class in China represents incomes ranging from $15,000 to $60,000 per annum, with one-third available for disposable spending (Censky, 2012). A middle-class consumer group comprising of more than 300 million people represents an enormous market for any consumer product (Luhby, 2012). This especially is the case considering the living cost in China is considerably lower than that of developed countries such as the United States, Japan or European countries (Luhby, 2012). The middle-class consumers are at the beginning stage of the cycle of the accumulation of products, which brings about opportunities for both local and international businesses (Luhby, 2012).

China's automotive sector has experienced tremendous growth alongside the economic growth of the nation (APCO, 2010). According to NBSPRC, China alone had produced 25.11 million units of motor vehicles in 2015. This number is greater than that of Europe and Japan combined (16.4 million units in Europe; 7.83 million units in Japan). With such capability of mass-production, China can have the potential to export the substantial amount of locally produced motor vehicles to the international market. The automotive market in China has been growing fast as well. In the year of 2009, China overtook the USA by selling 13.5 million motor vehicles, becoming the largest automobile consumer in the world (Kennedy, 2012). In fact, the automotive industry is regarded as a strategic industry in China, as it consumes substantial natural resources such as steel and petroleum, and it creates large amounts of employment (Wang and Lin, 2013). Therefore, the Chinese government has been actively pushing the development of the local automotive industry by issuing favourable policies such as subsidies and taxes refunds (Wang and Lin, 2013). OICA (2013) reports that the automotive industry is the largest contributor to the GDP of advanced countries. The situation is similar in China; in 2010, domestic consumption accounted for more than 10% of gross product sales in China, which exceeded a gross value of four trillion RMB (Pan, 2014).

1.2. The Bottleneck for Future Development

While the remarkable development of China's economy as well as its automotive industry has been widely acknowledged by the world, there is concern about the sustainability of such development. In fact, the fast growth economy of China is largely built upon the mass production of low-end and low value-added products (Huang, 2010). For example, the enterprises in YiWu (a city in Southern China) largely focused on producing low-end products such as buttons and zips. These businesses are heavily invested into by multi-national corporations (MNCs), as these products are needed in large quantity. Yet, the production does not require advanced technology or skills and consequently, do not add a substantial amount of value to the raw material. The primary risk associated with China's current economic structure is the fact that the focus on this form of production has resulted in, and has continued to reinforce, the imbalances of the industrial structure. This is because a firm that gains a profit by producing low-end products can cause an inefficiency of resource utilisation, as the products do not add much value; additionally, the high levels of income inequality in the country caused by the considerably lower labour rates as compared to other developed countries also contribute to these imbalances (Huang, 2010). These issues are seen by the Chinese government as the factors that can cause the country's instability.

In addition, such a low end, low value-added production focus can create a 'vicious circle', as companies in China do not provide any significant contribution to society and instead simply exploit the low labour rates to gain a competitive advantage (Feng and Wang, 2010). As this situation persists and becomes acceptable in China, future entrepreneurs will be less likely to develop innovative products and challenging business models, which are considered the main driver for economic growth (Feng and Wang, 2010). Instead, they are more likely to simply imitate low value production, which would eventually limit economic development further (Feng and Wang, 2010). The focus on low cost manufacturing also results in a low skills-oriented economy, which reduces the attractiveness of China to MNCs (Feng and Wang, 2010). At the same time, the Chinese population is continuing to age relatively rapidly, thus indicating that it is losing the advantage of its low-cost labour force, as the one-child policy may result in a significant shortage of a young and productive labour supply

(Das and N'Diagy, 2013). In fact, MNCs have started to adopt a 'China-plus-one' (investments in China and another emerging economy in Asia such as Vietnam) strategy (Wang and Lin, 2013).

There are similar issues with the automotive industry in China. Currently, the automotive industry in China remains relatively under-developed due to the limited technological capability. There is a substantial gap in the technological capabilities and a lack of innovation capabilities within the Chinese automotive firms (Holweg et al., 2009). The automotive industry in China received a substantial amount of foreign investment, yet automotive MNCs normally choose China for setting up their factories due to the relatively low cost of production (Wang and Lin, 2013). As a consequence, local Chinese automotive firms are not capable of competing in international markets (Wang and Lin, 2013). This explains why the majority of the locally produced vehicles are sold domestically. Taking the year of 2015 as an example, despite the remarkably high total production (25.11 million motor vehicles), only approximately 1.7% (427,700 units) of the locally produced vehicles were exported to the international market. The need for enhancement of the technological capability and innovation is, therefore, crucial in the automotive industry in China.

1.3. Chinese Government's Resolution

The central government of China has realised the serious impact of the current low-end production-oriented economy on what is referred to by the government as the 'long-term prosperity' of the nation. The government's 12th five-year plan (FYP) has shifted from its previous concentration on headline growth to instead emphasising 'inclusive growth', which is referred to as the efficiency of resource usage as well as technology development (APCO, 2010). The 12th five-year plan emphasised that the key focus for technology should be the transition from 'made in China' to 'designed in China' (APCO, 2010). It is recognised by the Chinese government that such a transition needs to be implemented by the enhancement of the indigenous innovation capacity in China. In fact, the significance of innovation was pointed out

by the pioneering Schumpeterian theories almost a century ago. In Schumpeter (1934) innovation is defined as *'the commercial or industrial application of something new - a new product, process or method of production; a new market or source of supply; a new form of commercial, business, or financial organisation (Schumpeter, 1934 p19)*. According to the Schumpeterian theories, innovation is the essence of economic growth, as it provides the basis of generation and distribution of wealth.

With the recognition of the significance of innovation, the Chinese government has been actively issuing policies to support the enhancement of indigenous innovation. The observation of a three-decade evolution of China's innovation policies suggests that an 'invisible hand', which is referred to as political guidance and control, has been pushing innovation activities to achieve the specific strategic objective of the government (Liu et al., 2011). For example, the 12th FYP expected to spend the equivalent of 2.2% of GDP annually on S&T development in order to achieve 3.3 patents per 10,000 people and an 87% high school enrolment ratio (APCO, 2010). The 'invisible hand' can be seen from the encouragement of both open and collaborative innovation. Specifically, Chinese firms are increasingly provided with political guidance to allow them to engage in collaborative innovation using networks to achieve high levels of input in their innovative activities (APCO, 2010). This has led to an increase in the level of innovation capacity and network openness in China as well as providing many Chinese businesses with a greater ability to overcome the various innovation barriers (APCO, 2010). It is found that such strategy has indeed led to the collaboration between local firms and driven higher levels of innovation (Hout and Ghemawat, 2010) especially in the development of advanced technologies in areas such as telecommunication industry (Pai et al., 2012).

Similarly, collaborative innovation in the automotive industry has also been pushed by the 'invisible hand', which in reflected in the strategy of 'market for technology'. The 'market for technology' strategy allows MNCs to access the substantial market of China on the condition that MNCs share key technologies with the local firms and make contribution to the enhancement of indigenous innovation. In fact, much political effort has been made to encourage collaboration between local automotive firms and MNCs (Orr and Roth, 2013). A key policy requirement is that automotive

MNCs must operate their businesses in China through international joint venture (IJV) partnerships, in which the Chinese partner(s) must have a total equity holding of no less than 50% (Zhao et al., 2005). The logic behind such a strategy is that IJV is believed to be a viable vehicle to drive innovation by the Chinese government, as it provides a platform of resource exchange and mutual learning (Chu, 2011). In order to ensure this actually happens, MNCs are also required to establish at least one collaborative R&D centre and transfer their technologies to the local joint venture partner at certain stages of IJV operation (Zhao et al., 2005).

The 'market for technology' strategy has successfully attracted the automotive MNCs to establish IJVs in China due to China's substantial market size. Despite the strict requirements imposed on MNCs, there are benefits of an IJV partnership as a form of international collaboration. The IJV model allows MNCs to utilise local resources and dramatically reduce the risks associated with the business, achieving fast access to the local market (Yan and Luo, 2001). The IJV partnerships help with the building of business relationships and allow the MNC to gain knowledge about the host country, while the domestic firm in turn benefits from the technology, management and capital the MNC offers (Cavusgil et al., 2008; Pan and Tse, 2000; Peng and Meyer, 2009). This echoes the Chinese government's strategy of 'market for technology'. In fact, the late 1990s saw a significant increase in the number of automotive IJVs in China as the 6th FYP emphasised on developing IJVs (Kanbur and Zhang, 2005). Currently, most of the major automotive MNCs have formed at least one IJV partnership in order to enter this market.

However, the setting up of a large number of automotive IJVs in China has brought about competition among the IJVs as well. The benefit of this is that, first, the competition has further helped Chinese automotive firms improve their capability, as the competition is between the automotive IJVs (in which they are partners) rather than between the local companies themselves and the automotive MNCs. Automotive MNCs have also helped local parties to reform, transforming from old fashioned state-owned enterprises to competitive modern businesses (Gallagher, 2003; Lane et al., 2001). Second and most importantly, there seems to be a further need for innovation within the IJVs themselves due to the intense competition. In

fact, an interviewee for this research commented on the serious competition in the automotive sector in China and stated that market maturity could pose a threat to the automotive IJVs:

> *Currently there are a lot of (automotive) joint venture firms in China. Some of them will disappear very soon. The competition (in the automotive industry in China) is intense, survival is not easy. You can consider it in this way, last year (2014) our country manufactured 20 million cars (approximate number). That is 100 million cars in five years. How much space of domestic need is there in China? Eventually there will only be some competitive (IJV) firms left in China.*

As stated in the quote, the IJV companies themselves need to be competitive in order to survive in China in the long run. This further underlines the need for innovation and grants a firm the competitiveness needed for its survival and growth. Hence, the automotive IJVs should be motivated to engage in innovation activities despite the need of local automotive firms for innovation.

1.4. Statement of Research Problem and Research Question

The Chinese government's strategy of enhancing innovation through international collaboration is supported by the current literature on international collaboration and IJVs. This is firstly because the collaboration with MNCs can establish a platform for inter-partner learning, which improves the organisational efficiency of both parties involved (Yan and Luo, 2001; Beamish, 2008). Additionally, MNCs are generally capable of a substantial amount of technological and managerial resources as well as operational experiences, which are considered to be the basis of innovation activities (Zhao et al., 2005; Inkpen, 2000).

These arguments are also supported to some extent by the current innovation theories. According to current theories, innovation, as a process of generating commercially valuable results, is implemented by input of resources (Rothwell, 1994; Chesbrough, 2003; Freeman, 1982). Increasing the input of resources and improving the process of innovation both increase the likelihood of innovation output. Specifically, the IJV benefits from direct access to the resources of the parent

company as well as the opportunity for collaborative innovation activities and inter-partner learning, and therefore is taken by current literature as an effective medium to drive innovation (Inkpen, 2000; Yan and Luo, 2001; Beamish, 2008) The innovation results can then be harvested by the parent company to enhance its technological capability and innovation (Pak et al., 2015; Beamish, 2008; Zheng, et al, 2018).

However, the real-world evidence would seem to suggest that there has been a fairly limited innovation output from the automotive IJVs in China. The evaluation of the innovation performance of the automotive industry as well as the Chinese automotive IJVs were carried out in the early stages of this research. The results revealed that they have failed to deliver substantial innovation performance, especially in terms of technological innovation. Instead, the innovation performance of Chinese automotive IJVs was found to be largely limited to the incremental changes made to existing MNC car models and in some minor cases, the introduction of new products based on the recombination of existing technologies. These types of innovation outputs are classified in this research as *incremental innovation* (improvement to existing product/technology) and *architectural innovation (recombination of existing technologies),* which represent lesser forms of innovation than *radical innovation* (e.g. the introduction of revolutionary technological breakthrough). These innovation achievements do not involved improvements to existing technology or introduction to new technology. As a consequence of limited innovation output, the parent companies will benefit from only limited knowledge feedback effects based on the innovation achievements of their IJVs. This was not the intended effect of Chinese government policy. This phenomenon is not fully explained in the current literature and is, therefore, identified as a gap in the current theory that this research will seek to fill. Therefore, the central research question of this thesis is:

Why has there been only limited innovation performance in the automotive IJVs in China, contrary to the current theories on the capacity of IJVs to drive innovation?

The significance of this research lies in two aspects. First, the research question sets out to identify the underlying assumptions that were made by the current literature. The results of this research contribute to the body of knowledge by exploring the

combination of factors that have not been previously considered in suggesting the capacity of IJV to drive innovation. Second, these results reveal the reasons why the Chinese government's policy of using IJV as a medium for the enhancement of the innovation capacity of local firms seems to be failing to achieve its objective. The outcome of this research will therefore guide improvements in making policies to enhance the indigenous innovation capacity of local automotive firms.

1.5. Overall Research Design

The objective of this research is to explore the explanation for the limited innovation performance in the automotive IJVs in China. In order to achieve the research objective, this research employs a qualitative multiple case study research method with a polar-case selection strategy. This is because a qualitative case study has been described as being advantageous for understanding highly complex social phenomena that involve 'how' and 'why' related research questions (Yin, 2014; Cassel and Symon, 2004). The multiple case selection strategy will allow some generalisability and replication that is not possible with a single case study. Additionally, the polar-type case selection strategy, representing the selection of cases that are the opposite to each other in nature, can provide relatively clearer research results (Eisenhardt, 1989). Specifically, this research chose three automotive IJV cases to ensure some generalisability in relation to the wider automotive industry in China and compared them with one highly innovative independent Chinese automotive firm (as a polar-type case to the IJVs).

The research selected three IJV cases on the basis of their representation of IJVs between Chinese automotive firms and automotive MNCs that are capable of highly advanced technology, as opposed to one highly innovative independent Chinese automotive company that does not rely on an IJV partnership. The data needed in this research were collected from a total of 26 interviews of carefully selected interviewees and was analysed using qualitative data analysis techniques, such as thematic analysis, coding and code mapping. The research was conducted in full compliance with the ethics policy of the University of Warwick (Appendix 6) to ensure

that the participating companies and interviewees were protected from any negative effects that might arise from it.

1.6. Structure of the Thesis

Following this chapter, Chapter 2 focuses on the review of the current literature on innovation. The theoretical basis of this research is drawn based on some well-established innovation theories, and a number of factors are concluded as to understand innovation behaviour. On the other hand, Chapter 3 mainly looks at how IJV partnerships can drive innovation activities. Thereafter, the evaluation of innovation performance in the automotive industry in China is performed in Chapter 4, and it provides the central research question on which this research is based.

The Research Methodology chapter (Chapter 5) lays out the philosophy and rationale behind the selection of the research method and the research design in detail. In the Data Analysis chapter (Chapter 6), the data from the case study of the independent automotive firm are analysed and compared against the current innovation literature to provide a good practice framework for the automotive industry in China. The data from the three IJV cases are then analysed individually in accordance with good practice in the same chapter. After the analysis of each of the individual cases, a cross-case analysis is performed, and the research results are drawn based on this. In the discussion chapter (Chapter 7), the implications of the research results are discussed and compared against the current literature. The contribution to knowledge is provided as the conclusion in this chapter. Finally, in the conclusion chapter (Chapter 8), the limitations of this research are discussed and recommendations for future research are made. The outline of the logic flow of this research is shown in Figure 1.2.

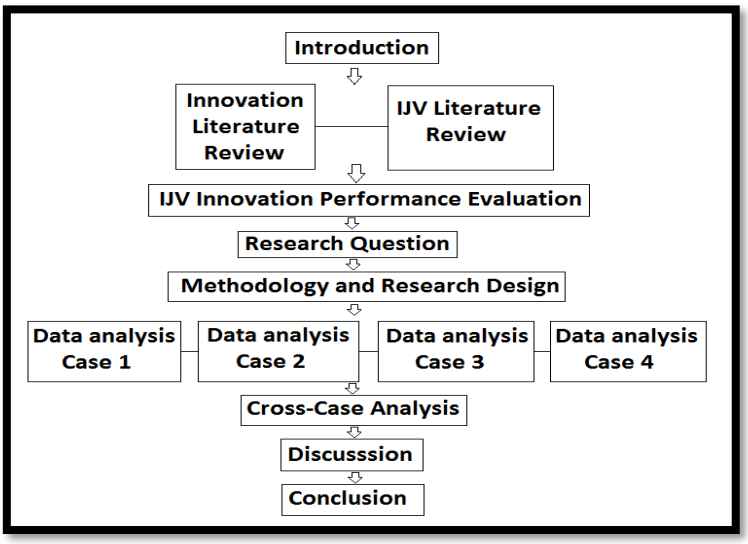


Figure 1.2: Structure of the Thesis

Chapter 2: Literature Review on Innovation

The enhancement of the indigenous innovation in China holds the key to alleviating the current constraints of economic development in the country as discussed in the previous chapter. This is also the case with the automotive industry in China, as the Chinese firms are generally not capable of competing in the international market due to the lack of technological capabilities. The central government of China has issued a number of policies to encourage the collaboration between local automotive firms and automotive MNCs in the hope that the innovation capability of local automotive firms will be enhanced.

The significance of innovation at both firm and economy levels was firstly pointed out by Schumpeter (1934) almost a century ago. The Schumpeterian theories proposed the pioneering idea that innovation leads to acquiring a competitive advantage for a firm. In Schumpeterian theories, the entrepreneurs that successfully deliver innovation contribute significantly to economic growth. Such an idea is confirmed by a large amount of subsequent research and hence, the significance of innovation at both firm and economic levels was widely recognised. As a consequence, there has been a considerable amount of academic efforts on innovation, which resulted in a number of well-established innovation theories.

This chapter will review and discuss the current literature on innovation. Specifically, this chapter will review some well-established innovation theories in order to explore what constitutes innovation. Additionally, in order to assess the innovation achievements in China's automotive industry, an appropriate means of measuring innovation is also needed by this research. Therefore, the literature on the measurement of the innovation performance of a firm will also be reviewed. At the end of this chapter, a number of factors that influence innovation will be concluded and carried forward as the theoretical basis of this research.

2.1. The Significance of Innovation

The modern innovation research originated from *'The Theory of Economic Development'* brought forward by Joseph A. Schumpeter. Schumpeter is regarded as the 'prophet' of innovation by subsequent research such as McCraw (2007). This is because one of his most distinctive contributions to the field of economics is the concept of 'new combination', or innovation in other words. Schumpeterian theories argue that innovation, which brings about valuable changes, represents the basis of the generation and distribution of wealth. Hence, innovation is regarded as the essence of economic growth as Schumpeterian theories consider change as the only constant in economic growth (McCraw, 2007). After almost a century, innovation is still taken as an essential factor of economic growth in modern economies. In light of the Schumpeterian theories and other innovation theories, this section explores the significance of innovation by reviewing it as a concept.

2.1.1. Innovation as a Theoretical Concept

In the pioneering work of Schumpeter (1934), the concept of innovation was defined as:

> *The commercial or industrial application of something new - a new product, process or method of production; a new m arket or source of supply; a new form of commercial, business, or financial organisation (Schumpeter, 1934 p19).*

This definition indicates a clear distinction between invention and innovation. According to Schumpeter (1934), innovation has impacts at both firm and economy levels, as the results of innovation create opportunities for investment and employment. In contrast, inventions refer to the technological changes that are not commercialised and therefore, they do not provide economic value (Schumpeter, 1934). Similar arguments are made by later research. For example, in defining innovation, Freeman (1982) presents the following argument:

> *An invention is an idea, a sketch or model for a new or improved device,*

product, process or system.... An innovation in the economic sense is accomplished only with the first commercial transaction involving the new product, process system or device, although the word is used also to describe the whole process (Freeman, 1982, p6).

Also, as the above quote suggests, innovation represents a process from invention to exploitation. This is supported by later research on the actual process of innovation (e.g. Rothwell, 1994; Nobelius, 2004).

One of the core arguments of Schumpeterian theories is that any firms that seek to generate profit must innovate (Schumpeter, 1934; Schumpeter, 1942). This is because the consequences of innovation, including new products, new technology, new business modes and new processes, can bring to a firm the competitiveness needed for survival and growth (Schumpeter, 1934). Later research finds that the competitiveness gained from innovation outcomes can further ensure the sustainability of future innovation activities (Chesbrough, 2003). This logic is seen as a virtuous circle of innovation, as shown in Figure 2.1 below.

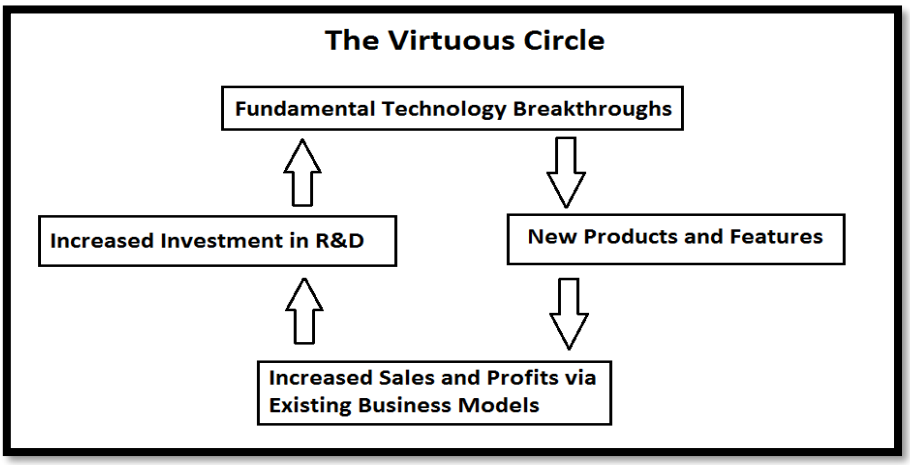


Figure 2.1: The Virtuous Circle of Innovation (Chesbrough, 2003)

The role of the virtuous circle as a positive relationship between the cost of R&D activities and their returns is reflected in a considerable number of successful commercial cases (Chesbrough, 2003). The entrepreneurs that gain competitiveness from bringing about valuable changes were described by Schumpeter (1942) as 'agents of innovation'. Good examples of such 'agents of innovation' can include Apple and Microsoft, which are both known as world leading companies and leading

innovators. The profit gained from their investment on innovation sustained their future innovation activities. In such way, these firms contribute to the economy as a whole by constantly bringing about valuable changes.

Later Schumpeterian theories also brought forward the concept of ***Creative Destruction***, which argued that revolutionary innovation incessantly destroys the existing economic structure from within and creates a new one (Schumpeter, 1942). The creative destruction results in a disequilibrium in the market and the creation of new source of profitability, which grants a firm competitiveness over its competitors (Schumpeter, 1942). The revolutionary innovation results that lead to creative destruction, especially in terms of the application of major technological breakthroughs, were generally termed as ***Radical Innovation***. *Radical Innovation* represents the creation of a completely new concept, technology or knowledge that has never been done before, which significantly improves the competitiveness of a firm (Leifer et al., 1991; Tushman and Anderson, 1986). The extent of the potential effects of radical innovation results are emphasised by Leifer et al. (1991) in stating:

> *...transform the relationship between customers and suppliers, restructures marketplace economics, displaces current products and often creates entirely new product categories...provide a platform for the long-term growth that corporate leaders desperately seek (Leifer et al., 1991, p21).*

However, not all innovation results have revolutionary impacts and create ground-breaking commercial value. There are also other forms of innovation results that create commercial value to firms. ***Incremental Innovation*** results represent the improvement or enhancement of an existing service, product or business process (Tushman and Anderson, 1986). Even though incremental innovation itself does not have revolutionary effects, it nevertheless represents changes that are commercially valuable and therefore improve the competitiveness of a firm (Tushman and Anderson, 1986). Other than this, the significance of incremental innovation also lies within its interaction with radical innovation results. A steady number of incremental innovation results that progressively improve the existing product/services would often eventually lead to radical innovation results (Katz, 2003). The radical innovation results would then create a significantly improved competitiveness of a firm that will

benefit the economy as a whole. The relationship between incremental innovation and radical innovation is indicated in Figure 2.2.

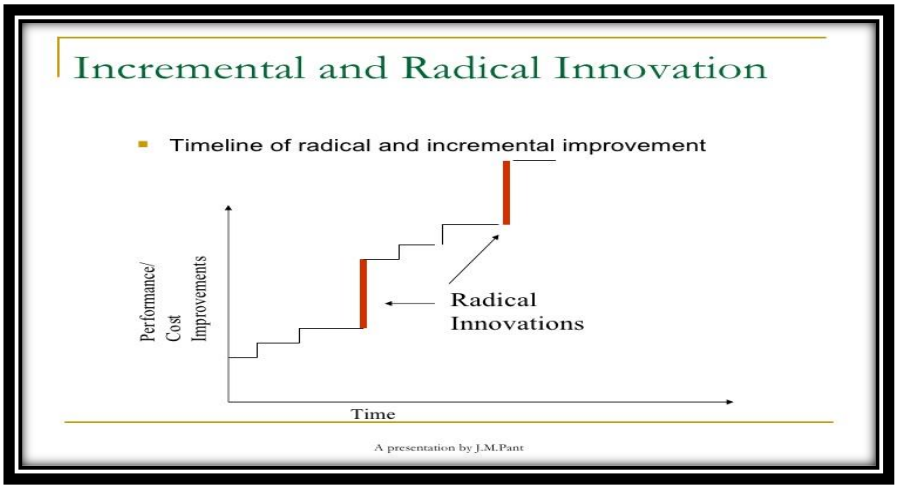


Figure 2.2: Incremental Innovation and Radical Innovation (Katz, 2003)

Incremental innovation and radical innovation represent the conventional typology of innovation. Despite being widely accepted, its completeness was questioned (Henderson and Clark, 1990). It is argued that this typology can potentially be misleading and incomplete. It was understood that there are some innovation outcomes that seemingly improve existing products and do not fall into either category of incremental or radical innovation (Henderson and Clark, 1990). Therefore, the concept of ***Architectural Innovation*** was proposed. Architectural Innovation focuses on the reconfiguration of current technology to put together existing components in a new way that delivers a new product or service (Henderson and Clark, 1990). This type of innovation is also significant as it creates valuable changes and brings a firm profit and competitiveness just like other innovation results (Henderson and Clark, 1990).

Schumpeter's definition of innovation also implies that innovation is not only confined to the development of products and/or services. Valuable innovation results can also include new processes and new business models. Tidd and Bessant (2005) reflect this view by focusing on the areas of application and conclude a four-Ps typology of innovation. These four types are ***Product Innovation*** – innovation to introduce or improve products, such as the introduction of new product or the application of new technology to an existing product; ***Process Innovation*** –

innovation to introduce or improve processes, such as the introduction of a new production method or management mechanism; ***Position Innovation*** – innovation to define or redefine the positioning of the firm or products, such as the transition from producing high-end products to affordable products; ***Paradigm Innovation*** – innovation to define or redefine the dominant paradigm of the firm, such as the transition from a physical store to an online store. The importance of the four-Ps typology suggests that innovation results can occur in every aspect of the operation of a firm, including the products or services that a firm delivers, the process of a firm's production or operation, the strategic position and the paradigm of a firm. The innovation results applied in these four areas can range from incremental to radical and consequently bring different level of competitiveness for firms (Tidd and Bessant, 2005).

Despite the significance of innovation at both firm and economic levels, Schumpeterian theories also pointed out that innovation itself requires a significant amount of resources to implement (e.g. Schumpeter, 1942; Schumpeter, 1966). The resources can include human, technology, knowledge, and financial resources. The process of innovation takes time and hence the resources must be committed throughout the process (Schumpeter, 1942). The significance of resources commitment in innovation activities is recognised by a number of subsequent research (e.g. Estrin, 2009; Goffin and Mitchelll, 2010). Nevertheless, the outcomes of innovation are argued to be uncertain and unpredictable (Saviotti, 1996; Nelson and Winter, 1982). For this reason, the investment on innovation does not guarantee returns on the investment. This can be seen from two aspects; either the invested resources fail to generate any innovation results at all; or the innovation results achieved by a firm cannot be optimally utilised by a firm due to the limitations of capability of a firm (Tidd et al., 2005; Chesbrough, 2003). In either case, the investment on innovation does not bring a firm any benefit in return. Instead, the invested resources are made in vain, putting a firm in an even worse situation. This is considered as the primary risk associated with any innovation activity. In fact, there are some innovation theories that have made attempts to understand, control and predict innovation. These innovation theories will be discussed in the following

sections.

2.1.2. Implication for this Research

The significance of innovation at both firm and economy levels was established by Schumpeterian theories almost a century ago. As discussed before, the central government of China considers the enhancement of innovation as the key to the sustainable growth of local economy. The significance of innovation in the automotive industry is also recognised by them. There have been policies issued to enhance the innovation capacity of local automotive firms to effectively enhance their competitiveness. The logic behind these policies reflects the hope that the local Chinese firms can improve their competitiveness in the international market and, ultimately, contribute to the sustainable growth of local economy. It seems that the encouragement of Chinese government on innovation enhancement is supported by the Schumpeterian theories and other innovation theories.

In light of Schumpeter's (1934) definition of innovation, this research defines innovation as *'successfully commercialised new technologies, designs, business models or processes'*. This definition reflects the consideration that innovation is different from invention, and innovation can happen in every aspect of a firm as illustrated by the 4-Ps typology of innovation. Despite the area of focus, the results of innovation range from *incremental innovation* to *radical innovation*, which will bring different levels of competitiveness to a firm. However, it should be highlighted that the innovation results that are specifically expected by the Chinese government are mainly technological innovation results, preferably in terms of the introduction of revolutionary new technology at a radical level. This is because the major issue with the automotive firms in China is that the absolute majority of them are incapable of innovating and delivering technologies that are competitive in both local and international markets. Instead, the automotive firms in China have been focusing on the production of low-end cars based on the labour and material cost advantage (Chu, 2011), which is not a sustainable strategy. Therefore, the enhancement of the technological innovation capacity is considered to be the solution to the current

issues with the local automotive firms by the government.

As discussed before, the Chinese government's strategy of enhancing innovation in the automotive industry represents the encouragement on collaborative innovation activities between local automotive firms and automotive MNCs (Zhao et al., 2005). This strategy resulted in the strict requirements of the establishment of IJVs and collaborative R&D centres, as the government expects the local firms to access the resources and learn from MNCs in order to enhance their innovation capacity. Taking this into account, the rest of this chapter will review some well-established innovation theories in order to understand such a strategy from the theoretical perspective. Specifically, this research will critically review some innovation theories and draw a number of factors to understand innovation. These factors will be taken forward as the theoretical basis of this research.

2.2. Understanding Innovation:

It was established in previous section that innovation is significant for firms and economies. Yet, there are also risks of associated with innovation due to its unpredictability and high rate of failure. Hence, much effort has been made to understand innovation behaviour. In early research, the technological change was regarded as activities transpiring inside a 'black box' (Rosenberg, 1982). The input of resources and output of innovation results with the addition of the so-called 'black box' together constitute a simple model of innovation (Rosenberg, 1982). The Black Box Model is shown in the figure below.

Figure 2.3: The Black Box Model (Rosenberg, 1982)

Since the model is fairly simple in nature, it has only limited explanatory power.

Despite its simplicity, it has some important implications for innovation research that were supported by later research. First, innovation represents the whole process from acquiring resources (input) to generating innovation results (output), which includes a process of innovation (the black box). Second, the resources to be spent on R&D activities (the input) is the basis of any innovation activity. Third and as a consequence, the more resources a firm spends on R&D, the more innovative results a firm will obtain (Rosenberg, 1982; Mansfield, 1995).

These implications can be seen from a number of well-established innovation theories that have further progressed the understanding of innovation as a human and organisational behaviour. In this section, a number of well-established innovation theories will be presented and discussed in order to draw a theoretical basis for this research. Specifically, this section will to look at innovation theories from the perspectives of the input of resources and the innovation process referred to as the 'black box'. A number of factors that effectively constitute innovation will be drawn at the end of this section.

2.2.1 Innovation as a Process

Initial attempts to understand the process of innovation resulted in the development of the linear models of innovation. The innovation process was initially believed to be a sequential, step-by-step process (Nobelius, 2004; Godin, 2006). There are two main derivatives of the linear model of innovation, namely the ***Technology Push Model*** and the ***Market Pull Model*** (Rothwell, 1994). The logic of initial technology push models according to Rothwell and Zegveld (1985) is as follows:

> *discoveries in basic science lead eventually to industrial technological development which result in a flow of new products and processes to the market place (Rothwell and Zegveld, 1985, p49).*

Therefore, the technology push model emphasises the significance of developing basic science (Hobday, 2005; Nobelius, 2004). The elements of the model are presented in Figure 2.3.

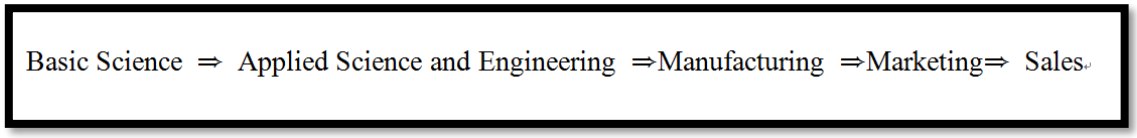


Figure 2.3: Technology Push Model (Rothwell, 1994)

Under the technology push model, a new product with new features or new processes for more efficient production can be generated. However, with the improved productivity of firms, it was also found that the newly introduced products do not always meet the need of the market (Clark, 1979). Economists and business managers, hence, shifted the focus to the market need from basic science development (Clark, 1979). As a consequence, the ***Market Pull*** was proposed. The market pull model emphasises the significance of existing market demand and takes it as the driving force for innovation activities (Rothwell, 1994). The sequence of the linear market pull is presented in Figure 2.4.

Figure 2.4: Market Pull Model (Rothwell, 1994)

The technology push and market pull models of innovation made attempts to identify the factors that lead to the adoption of new technologies and the drivers of successful innovation (Nobelius, 2004; Hobday, 2005). Later research finds that both the market and the technology are driving forces of innovation (Rothwell, 1994). As a result, the ***Interactive Model of Innovation*** (the third generation of the innovation process model) combines the effects of the market need as well as technology development and looks at the process of innovation in relatively more complex terms, as shown in Figure 2.5.

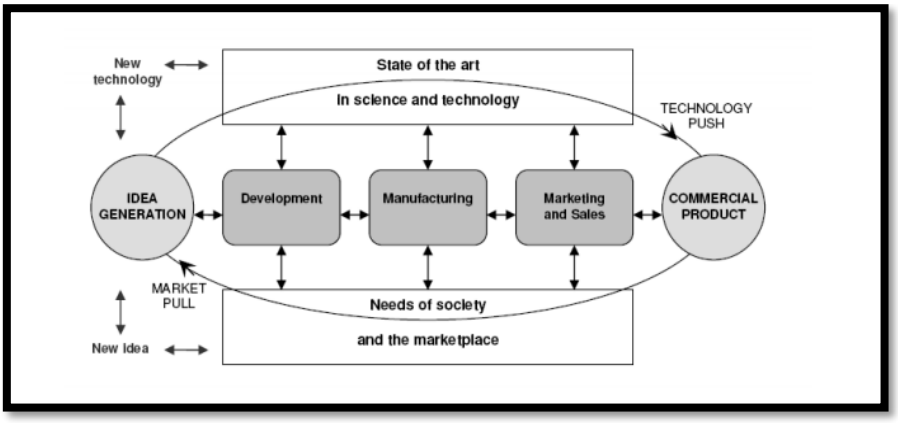


Figure 2.5: Interactive Model of Innovation (Rothwell, 1994)

The interactive model not only combines the ideas of the linear market pull and technology push models but also presents the innovation process in a systematic way, where all of the factors interact with each other (Hobday, 2005). Moreover, the interactive model of innovation is a process that is seen as a complex network of communication at both the inter-organisational and extra-organisational levels (Rothwell, 1994). This model put together various internal functions of the organisation and links the organisation with wider scientific and technological communities and with the marketplace (Nobelius, 2004). The major advance made by the contribution of the interactive model of innovation can be seen from three aspects. First, it stresses the significance of both the market and basic science rather than considering it to be a question of either/or, as both factors are considered to be significant (Hobday, 2005). Second, the interactive model of innovation no longer considers innovation as the final product of the process and instead, it finds that innovation can actually happen at every step throughout the process (Hobday, 2005; Rothwell, 1994). Moreover, it makes an attempt to explore the linkages with external parties such as customers, research institutes and suppliers (Hobday, 2005).

Though the interactive model of innovation conceptualised more elements and presented the innovation process in more complex terms, it is also criticised for failing to provide explanation for why some firms are more innovative than others. This is particularly the case considering the interactive models still suggest that the innovation process is a sequential process where the stages happen one after another without the integration of the involved elements in the innovation process

(Hobday, 2005). Therefore, later research focused on developing parallel and integrated innovation models and the ***Integrated Model of Innovation,*** as the fourth generation of the innovation model was proposed (Figure 2.6).

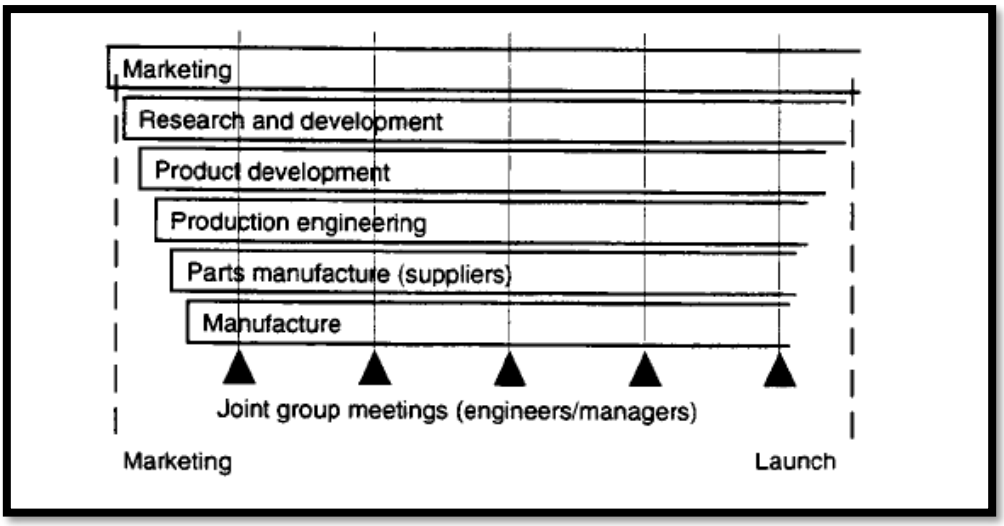


Figure 2.6: The Integrated Model – Example from Nissan (Graves, 1987)

The integrated model demonstrates the integration of cross-functional teams of each department within a firm as well as the integration of external activities with its stakeholders (Rothwell, 1994). The important advancement of the Integrated Model is that it no longer takes the innovation process as a sequential process and rather, the processes of innovation are parallel, where departments of a firm work together in an integrated system (Nobelius, 2004). On the other hand, as demonstrated by some Japanese firms, the parallel development and integration of departments explained the differences in the innovation performance of firms to some extent (Rothwell, 1994).

As the significance of external collaboration has been increasingly recognised, the fifth generation of ***System Integration and Networking*** (SIN) model introduces the external collaboration as a key element. The SIN focuses on the internal integration and external networking. Networking is argued to be the main medium by which ideas are communicated/channelled and knowledge is transferred between firms, thereby facilitating innovation (Freeman, 1991; Fagerberg et al., 2005). The networks of innovation activities pool more technical, infrastructural and human resources than a single party and, therefore, are more likely to achieve innovation results (Niosi,

2010; Resele, 2015). The synergistic effect of the innovation networks enhances their capacity to produce positive effects for all the parties and enables them to compete with large companies (Fagerberg et al., 2005; Freeman, 1991). Indeed, even firms that would otherwise compete with each other in the marketplace are involved in strategic collaborative networks with the aim of achieving the innovation that they need to keep pace with industry developments (Niosi, 2010).

One of the main advantage of SIN is the improved efficiency of innovation activities, as the competition between firms requires a firm to innovate effectively and efficiently. This is because the efficient innovator can enjoy advantages such as a greater market share and monopoly profits, whereas late comers join the market with some disadvantage (Rothwell, 1994). Networking is taken as a means of reducing the risks of uncertainty and unpredictability in innovation activities (Fagerberg et al., 2005). This is because firms that collaboratively innovate in a networking system effectively share the cost of innovation and innovation results. Firms that struggle to keep pace with innovation results due to their limited R&D capabilities can benefit from external networking with other firms/institutes, which can provide some basis of R&D capabilities (Lundvall, 1985). Despite the advancements, its limitation is also recognised. For example, this model cannot explain how the network of a number of small firms is different or similar to that of a large firm (Edquist, 1997). Furthermore, the model cannot fully explain the effects of the interdependence of firms and the competition between firms on the collaborative innovation activities (Edquist, 1997).

At this point, a number of theoretical innovation process frameworks that made attempts to explore the ‘black box’ have been discussed. Despite the limitations on these innovation process models, they have made some theoretical progress in understanding innovation as a process. The evolution from these innovation models witnessed the shift of attention from internal mechanism to the external forces, such as the collaboration with research institutes, universities or other firms. In fact, the significance of external forces is also recognised in the theories that deals with the input and output of the black box, resulting in the transition from the *Closed Innovation* paradigm to the *Open Innovation* paradigm. The next section will discuss

the *Open Innovation* theory and explore the effects of external collaboration on the input and output of the 'black box'.

2.2.2 Open vs Closed Innovation

Based on the recognition of the significance of innovation, businesses and policy makers have largely been focusing on delivering innovation results to enhance the competitiveness of firms. As a logical consequence, firms were committing their resources to establish a virtuous circle which grants them sustainable competitiveness in the market. Initially, the key feature of this circle represented the belief that independent R&D activities based on a firm's own resources could bring the competitiveness to a firm, which can sustain their further innovation activities. Such a paradigm was then summarised by Chesbrough (2003) as ***Closed Innovation***.

As the competition in the market has become increasingly intense, there is a pressing need for efficiency in generating innovation outcomes (Rothwell, 1994). However, there are always limitations of a firm's capability (Chesbrough, 2003). As a result of the limitation of capabilities, the resources available to a firm are not always enough to achieve the expected innovation results owing to the uncertain nature of innovation. Instead, the innovation results filtered out by one firm can be successfully commercialised by other firms and hence are expected to be achieved by other companies (Chesbrough, 2003). Therefore, the closed innovation paradigm is not always effective in building up a firm's competitiveness as the closed innovation paradigm does not always lead to what is expected to be achieved by one specific company. The collaboration of a few firms seems to be necessary to overcome this issue, which echoes the fifth generation of innovation process model that stresses the significance of external networking. Based on this rationale, the concept of ***Open Innovation***, as opposed to the *Closed Innovation* models, was therefore proposed (Chesbrough, 2003). The comparison of the closed innovation model and Open Innovation model is presented in Figure 2.7.

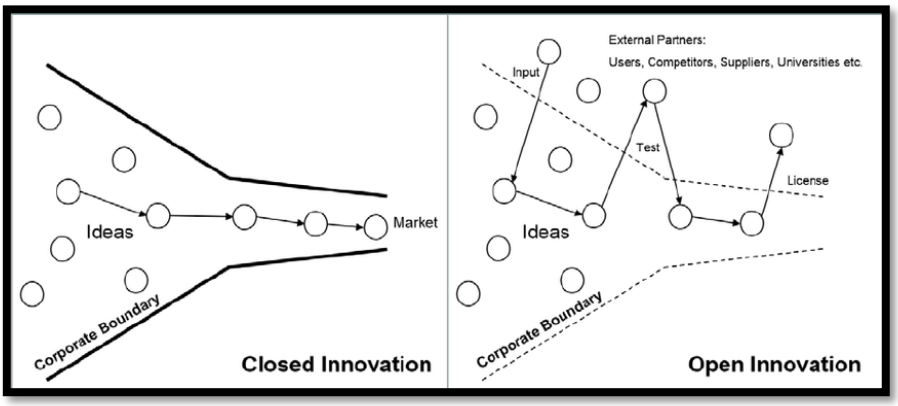


Figure 2.7: Closed Innovation vs Open Innovation (Chesbrough, 2003)

As Figure 2.7 shows, the significance of the Open Innovation model relative to the Closed Innovation Model lies in the utilisation of both internal and external ideas and R&D capabilities, as well as the current market and new markets, to advance a firm's technological capability. In an open innovation system, collaborative firms share their resources to improve the accessibility to the resource input of the involved firms, which increases the likelihood of generating innovation results (Chesbrough, 2003). Also, at the other end, sharing results of innovation activities would mean that there is a better opportunity for the innovation results to be successfully commercialised (Chesbrough, 2003). For these two main reasons, the risk and the reward of R&D activitiesmor are shared amongst the involved firms, which can reduce the opportunity cost of the closed innovation model and increase the efficiency of R&D activities. Hence, the Open innovation paradigm is considered a more efficient way of innovation (Chesbrough, 2003).

It was discussed before that the input of resources and output of innovation results represent the two ends of innovation activities. The Open innovation model can only 'open' from one end and hence, there are two other types of Open innovation. The opening to external resources as an input is perceived by Chesbrough (2006) as an outside-in open innovation paradigm, whereas the outflow of under-utilised ideas is treated as an inside-out open innovation, as Figure 2.8 shows.

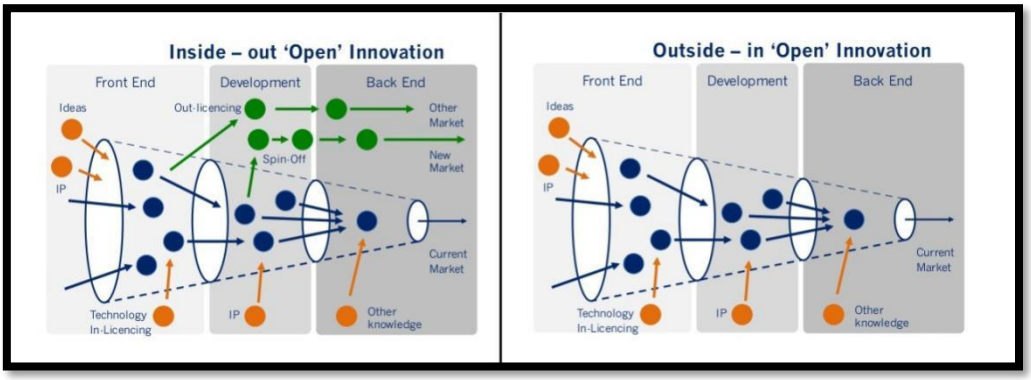


Figure 2.8: Inside-out and Outside-in Open Innovation Model (Chesbrough, 2006)

An Open Innovation system stresses the significance of a system where a number of firms collaborate by sharing resources and R&D capabilities as the external resources and R&D capability can improve the overall efficiency of innovation activities within a system (Chesbrough, 2003). Successful external engagements with other companies and/or research institutes to develop collaborative R&D capabilities are therefore considered significant (Salter et al., 2014).

In fact, similar arguments are made by other innovation theories. For example, the theory of Innovative Milieu also finds synergistic effects of external collaboration and networking of both formal and informal relationships of a number of firms in a specific geographical region (Camagni, 1991). Though this theory focuses on the regional effects on innovation, it also suggests that the collaborative innovation activities of a number of firms can improve the overall efficiency of innovation in the system. Similarly, Porter's (1990) theory of innovative clusters suggests that the synergistic effect of a number of firms in a specific region collectively results in a superior innovative capability (Porter, 1990).

2.2.3. Implications for this Research

The initial attempt made to understand innovation as a human and organisational behaviour resulted in the so-called 'black box' model. Despite its simplicity, it mapped out the three main areas of research that focus on understanding innovation behaviour – input of resources, the actual process of innovation and the output of innovation results. In this section, some of the well-established innovation theories concerning these three areas are reviewed. Even though innovation still seems to be

an under-researched academic area, this research concludes there are three factors that effectively affects innovation from the literature reviewed in this section.

1) Market and Industry as Drivers of Innovation

The significance of the needs of the market and the development of basic science are recognised in the first three generations of innovation process models. Instead of an either/or question, the interactive model of innovation suggested that both the market need and technological development are drivers of innovation activities. In fact, it is understandable that a firm should have a picture of the needs of the customers through observing and detecting the gap between the existing product and the trends of market development, which eventually drive the innovation activities. On the other hand, the industrial development can give the firm an insight into the new technologies emerging in the industry as well as the maturity of some old technologies, which can also drive innovation activities in an effective direction. These two driving forces represent the two ends of innovation activities, which are the input of resources and the output of innovation results. Hence, this research follows the theoretical suggestions and concludes that the market need and industrial development are important drivers of innovation activities.

2) A Process of Innovation

Innovation is a process of generating commercially valuable results as suggested by the literature reviewed in this section. The efforts made to understand such processes resulted in a number of theoretical models. Early models focused on the internal mechanism of a firm to generate innovation results whereas subsequent models shifted the focus to the combination of internal integration and external collaboration. The models discussed in this section provide some theoretical suggestions of what the innovation process can be. They have taken more and more elements into consideration and, hence, become more and more sophisticated in nature. Despite their explanatory power, the weaknesses of these theoretical models are also clearly recognised by the existing literature. Hence, it would not be appropriate to suggest that any of these innovation process models can fully explain the process of innovation and predict innovation results. Perhaps the most suitable

model of the innovation process consists the detailed steps of a series of actions that would certainly lead to successful and expected innovation results in an efficient way. Yet, the current literature does not seem to have achieved this so far. Therefore, based on the review of relevant literature, this research can only conclude that there is indeed a process of innovation which has an impact on the innovation performance of a firm. Different firms can have different processes of innovation, which can explain the difference in their innovation performance to some extent.

3) The Significance of External Resources via External Collaboration

The fundamental argument of Open innovation is that firms can be engaged in a collaboration where the input of resources and the innovation outputs are shared. In such way, the overall innovation performance of the involved firm can be enhanced, as the overall resources input and R&D capabilities are improved. This once again echoes the previous arguments that resources input is the basis of innovation activities. Moreover, the arguments of both SIN and Open innovation would suggest that accessing external resources via external collaboration can enhance the likelihood of a firm or the system of a number of firms to generate successful innovation results. The motivation for sourcing external resources, as argued in the innovation theories presented in this section, is to achieve more innovation results through the access to more resources. Based on this rationale, this research concludes that external resources, including ideas, technology, knowledge and R&D capability, influence the innovation performance of a firm and accessing more external resources increases the likelihood of innovation.

As discussed previously, the Chinese government encourages collaborative innovation activities between local firms and MNCs, particularly in the form of IJVs in the automotive industry. It seems that the logic behind this is supported by the innovation literature. This is because, first, the collaboration with MNCs can establish a platform of exchanging resources. MNCs, with a long time of development generally have highly advanced technology and managerial know-how (Zahra et al., 2000; Fu et al., 2011). The collaboration with MNCs can allow the local firm the opportunity to access the highly advanced resources of MNCs for the purpose of innovation. Hence, the collaboration with MNCs can be seen as a means of

establishing the Open Innovation paradigm. Second, the role of MNCs in building up the indigenous innovation capacity in China is also seen from the perspective of organisational learning (APCO, 2010). As MNCs generally have a well-established way to innovate, learning from the MNCs through the cooperation of an IJV company can improve the innovation process of the local firms. In fact, an IJV is argued to be a good medium for exchanging resources and for inter-organisational learning. The relevant literature on IJVs will be presented in the next chapter.

2.3. Building an Innovation-Friendly Environment

Other than the innovation theories that explore the input of innovation and the process of innovation, the role of the organisational environment in innovation activities is also recognised in the current literature. It was established in the previous section that innovation represents the process of generating new and commercially valuable outcomes. Key factors in the innovation process, such as ideas, technology and people, are argued to interact and interconnect in the internal business environment (Estrin, 2009). Hence, an innovation-friendly internal environment is argued to be critical, as it enables the factors of innovation to come together and gradually leads to innovation results (Estrin, 2009). Considering the significance of an innovation environment, this section will review the relevant literature as to explore what effectively builds up an innovation-friendly environment.

2.3.1. The Culture of Innovation

An innovation-friendly internal organisational environment that drives and supports innovation activities is generally regarded as the ***Culture of Innovation***. The culture of innovation is also taken as a means of supporting the innovation activities of a firm in order to ultimately achieve competitiveness (Goffin and Mitchell, 2010). The significance of such an innovation culture is recognised by a number of research papers (e.g. Beswick, 2015; Katz, 2003; Goffin and Mitchelll, 2010). Its impact is recognised by Beswick (2015) as:

> *An innovation culture is one in which the organisation is geared up to deliver products and services levels which will enable it to stand out from its*

competitors (Beswick, 2015, p15).

The establishment of the culture of innovation starts from the corporate strategy designed by the senior management of a firm (Beswick, 2015; Tidd and Bessant, 2005; Goffin and Mitchell, 2010). According to Tidd and Bessant (2005), the corporate strategy of a firm defines the purpose of a firm and hence, a corporate strategy towards innovation will allow a firm to focus on delivering competitiveness through innovation. As the involvement of employees is another important factor in building up the culture of innovation, such corporate strategy will influence the employee and motivate the employees to get engaged in innovation activities (Katz, 2003). The result of such influence can lead to what is referred to by Goller and Bessant (2017) as the 'willpower' of innovation which represents the willingness and persistence of employees to innovate.

In order to establish the culture of innovation, the commitment of organisational resources is also needed (Katz, 2003; Goffin and Mitchel, 2010). According to Katz (2003), the commitment of resources can include the investment on R&D infrastructures, talent recruitment as well as employee training and education. As discussed before, resource input is the basis of innovation activities. It is argued that the lower level employees need flexibility to utilise the available resources in the innovation activities (Katz, 2003). Hence, echoing the arguments established in previous sections, allocating more resources increases the likelihood of innovation results. Also, the commitment of organisational resources for the innovation activities can further strengthen the involvement of employees (Goffin and Mitchell, 2010).

The senior management's strategic focus on innovation and the commitment of organisational resources together creates an organisational culture of innovation. These two factors interact and influence each other, leading to what is referred to by Katz (2003) as the 'ambidextrous organisation', which means creating a successful future while doing well in the present. This further echoes the innovation theories discussed in previous sections.

In contrast to the innovation-friendly culture of innovation, Goffin and Mitchell

(2010) also introduce the concept of the counter-culture of innovation, which represents the organisational culture that suppresses and limits the innovation activities of a firm. Common causes for the establishment of counter-culture of innovation can include a dramatic change in organisational structure (e.g. the downsizing of a firm), a very bureaucratic organisational mentality and structure, and the lack of strategic focus on innovation by the firm's senior leadership (Goffin and Mitchell, 2010). The reliance on the existing business model may lead to short-term business success; however, these obstacles to organisational changes will limit the firm's sustainability of development (Goffin and Mitchell, 2010). The likelihood of generating innovation results is limited due to these common causes.

2.3.2. The Strategic Intent

It was established in the previous section that the culture of innovation represents an innovation-friendly environment that drives and supports innovation activities. The culture of innovation starts from the strategic focus of the senior management on innovation. The corporate strategy of innovation is implemented by the commitment of organisational resources. In fact, there are western firms that focus on achieving and maintaining competitiveness through innovation. Additionally, it was found that the western firms focused on the fit between current resources and the advantage they can sustain (Hamel and Prahalad, 1989).

However, the corporate strategy of some Japanese firms was found to be rather different. According to Hamel and Prahalad (1989), there were some Japanese firms, such as Komatsu and Honda, that had the ambitious strategic goal of becoming global industrial leaders. In order to achieve this strategic ambition, these Japanese firms aggressively leveraged resources to innovate to build up new capabilities (Hamel and Prahalad, 1989). The result of the ambitious strategy of these Japanese firms was that they achieved better innovation performance, which allowed the Japanese firms to out-perform their Western rivals (Hamel and Prahalad, 1989). The Japanese firms' 'obsession' of becoming world industrial leader reflects what is defined in the literature as the ***Strategic Intent*** (Hamel and Prahalad, 1989).

The concept of strategic intent represents a viable alternative to the traditional

'strategic fit' model that was widely adopted by Western firms (Hamel and Prahalad, 1994). While strategic fit model focuses on existing capability and opportunity, the strategic intent represents an organisational vision for the creation of new capabilities and future opportunities (Hamel and Prahalad, 1994). However, it is also recognised by Hamel and Prahalad (1994) that clearly defining the organisational vision for the future would mean that current resources and capability of a firm will not suffice. Hence, the strategic intent drives innovation activities, as a firm needs to fill the gaps in current capabilities to achieve its organisational vision (Hamel and Prahalad, 1994). Therefore, such a strategic intent guides a firm towards an innovation driven strategy and forces a company to fully utilise their resources to innovate (Khayati et al., 2014). In fact, there are four primary factors that were identified from the strategic intent of Japanese firms. These factors suggest that the concept of strategic intent is closely associated with innovation. They are stated as follows:

Building layers of advantage: The Japanese firms had always been delivering innovation results that granted them further competitive advantage on top of their existing advantage. The innovation results can include the new products, new business processes or business models. Thus, this strategy has led to the improved competitiveness of the Japanese firms. This strategy seems to perfectly align with some innovation theories. The way that Japanese firms deliver innovation results can be demonstrated by the factors that follow.

Searching 'loose bricks': This factor represents the exploration of the new needs from market opportunities and creation of new markets. As discussed before, the need from the market can drive innovation activities. In this respect, the Japanese firms identified the under-occupied market and developed a new market based on their understanding of the market. Driven by this, the Japanese firms' innovation activities resulted in some new products/services that were not available to the market before, which granted them competitiveness.

Competing through collaboration: Japanese firms established external collaboration to improve the innovation capacity and, consequently, the competitiveness of a firm. The significance of external collaboration in innovation activities is recognised in

some well-established innovation theories, such as the Open Innovation theory. The fundamental argument is that several firms can efficiently innovate and improve their competitiveness within a system where the input and output of innovation activities are shared. In this respect, the Japanese firms demonstrated this by engaging in a collaboration with western competitors and improving their own competitiveness.

Changing engagement terms: Japanese firms refused to adopt the existing business models of Western firms. Instead, they focused on the creation of new business models and processes. As demonstrated by the competition between Cannon and Xerox, Cannon created a new channel of product distribution and services, which has effectively changed the existing business models. This led to Cannon acquiring a cost advantage over its competitors, granting it competitiveness.

The strategic intent represents the top management's strategic design towards achieving industry and market leadership. The strategic intent provides a firm and its employees the emotional and intellectual energy to achieve the organisational ambition (Hamel and Prahalad, 1989). Such organisational ambition, as demonstrated by Japanese firms, represents the focus on the innovation-driven strategy that eventually leads to the improvement of the competitiveness of a firm (Hamel and Prahalad, 1989). This logic seems to perfectly align with Schumpeterian theories and other innovation theories as discussed in previous sections. In fact, it is found that the adoption of such strategic intent can lead to a superior organisational performance due to the delivery of innovation results (e.g. Mariadoss et al., 2014; Bozkurt and Kalkan, 2013; Sneddon and Mazzarol, 2002).

However, the risk associated with any innovation activity is that the investment of resources does not always guarantee a return (Tidd et al., 2005). Considering the strategic intent is associated with leveraging a substantial amount of resources, it requires good knowledge of the markets and prospective customers to effectively achieve innovative changes (Venkataraman, 2014). It also requires the devotion of employees and managerial planning competences to effectively implement the strategic intent (Venkataraman, 2014).

2.3.3. Implications for this Research

Based on the understanding of some innovation theories, a number of factors that influence the innovation performance of a firm were concluded in previous sections. Other than these factors, the literature reviewed in this section suggests that the internal environment of innovation also plays an important role in building up a firm's innovation capacity. The culture of innovation, which represents an innovation-friendly organisational environment, drives and supports innovation whereas the counter-culture of innovation obstructs the innovation activities. There are similar arguments made by both the concept of strategic intent and culture of innovation. In light of the similar arguments, this research draws two main factors that builds up an innovation-friendly environment.

1) The Strategic Focus on Innovation

Most notably, both concepts stress the significance of the a firm's strategic focus on innovation. The concept of strategic intent demonstrates the effects of the senior management's strategic focus on the innovation performance of a firm. Yet, it would not be appropriate to suggest that an ambitious objective would suit every single firm given the resources and managerial capability needed for an aggressive innovation strategy. It is rather important to understand that the senior management's strategic focus on innovation drives the innovation activities. The corporate strategy is designed by the senior leaders' strategic focus, as it defines the purpose of a firm. Hence, the strategic focus on innovation can encourage and motivate a firm to innovate. Though the involvement of employees is argued to be important as well, it seems that such involvement is followed by the strategic focus of senior leaders. Therefore, this research concludes that a firm's strategic focus on innovation is an important factor effectively contributing to build up the innovation capacity of a firm.

2) **Commitment of Resources on Innovation**

Both concepts stress the need of the commitment of organisational resources. As suggested by the innovation theories discussed in previous sections, resources are the basis of innovation activities. This argument is once again supported by the literature on innovation environment. As suggested by the literature, it is necessary for a firm to commit resources to the innovation activities in order to implement the

corporate business strategy towards innovation. The commitment of organisational resources allows the lower level employees to flexibly utilise the resources to generate innovation results. Therefore, the commitment of organisational resources is considered as one of the important factors that influence the innovation performance of a firm.

However, in the context of automotive IJVs in China, the organisational environment is rather influenced by both foreign and local parties. Most of the automotive IJVs in China have an equally split control over the joint venture company, and most of the automotive IJVs have employees from both the foreign and local parties. This has made the building of the innovation environment more complex, as the senior managers from different parties might have different strategic expectations over the IJV. Nevertheless, most of the automotive MNCs, with a long legacy of development and expansion, generally have a culture of innovation that drives their innovation activities. Consequently, the result of working closely with automotive MNCs can have a positive impact on the establishment of a local innovation culture through learning by doing.

2.4. Measuring Innovation

Previous sections of this chapter discussed innovation theories and concluded a number of factors that influence the innovation performance of a firm. In order for the management to assess the innovation performance of a firm, there is also a need for an innovation measurement method. However, the innovation performance of a firm can be difficult to measure. This is especially the case with regards to the comparison of how innovative different types of businesses are (Nelson, 2000). There are a number of innovation measurement methods provided in the current literature. These methods can be divided in to two major types – qualitative measurements and quantitative measurements. This section will focus on discussing these innovation measurement methods, including their strengths and weaknesses.

2.4.1. Qualitative Measures

One of the most commonly used measurements is the ***R&D survey***. It is widely used

by journalists and consultants, and its effectiveness is seen in it being able to determine and differentiate the level of innovativeness of a company (Saunila, 2016). The idea behind this method is that in most firms, the R&D department represents the major source of innovation output, including new ideas, new products, and new services as well as the improvement of existing products or technology (Saunila, 2016). The assessment of the performance of the R&D department of a firm is therefore seen as an indication of the innovativeness of a firm. In fact, the ranking of world's most innovative companies are concluded by some consulting companies such as Forbes and Boston Consulting Group (BCG) in such ways. Yet, the limitation of such a method is also recognised and discussed in the literature. For example, Saunila (2016) points out the weakness of this method is that it considers the R&D capability of a firm rather than the overall innovativeness of a firm in other areas.

While the R&D survey method is heavily based on the R&D side of the business, the **Diamond Model** proposed by Tidd et al. (2005) evaluates the firm's overall innovation performance from different areas of the business. The Diamond model of innovation consists of five dimensions. The five dimensions are strategy, process, organisation, linkage and learning dimensions respectively (Shown in Figure 2.9).

Figure 2.9: Example of Diamond Model Results (Tidd et al., 2005)

Each of the above dimensions is assessed using a set of questions in order to measure a firm's innovative performance. The acquired data is then used to generate a radar diagram to provide an indication of the overall innovation performance of a firm. Some of the elements in the five dimensions seem to echo the innovation theories

discussed before. For example, the strategy dimension takes the evaluation of the relevance of a firm's strategic focuses to innovation, which echoes the previous arguments. It is the same with the linkage dimension, where the significance of an external network is considered important so as to build up a firm's innovation capacity as well as the dimension of strategy, which evaluates the strategic focus on innovation activities.

2.4.2. Quantitative Measures

In some cases, the quantitative measure methods are preferred. This is because the nature of qualitative measures would mean that the answers to the survey questions can be subjective and, hence, can cause a bias. Instead, the quantitative measurements reflect the facts rather than opinions. There are some measurement methods that use quantitative data to measure and compare the innovativeness of firms. Perhaps the most used quantitative data is the number of patent files, as it shows how many new inventions a firm has managed to achieve. Therefore, it is no surprise to see that there are still a number of industrial research institutes that heavily rely on the number of patent files to measure a firm's innovation performance, especially Chinese research institutes. For example, the National Development and Reform Committee (NDRC) takes the number of patent files as a rigid index for the level of innovation achievements. It is understandable that something has to be new and valuable in order to be patented and therefore, the number of patents can reflect the innovativeness of a firm to some extent. Nevertheless, the patented invention/development is not always applied in the operation of business. As is widely known, the formula for Coca-Cola has not been patented due to the fact that it is regarded by the firm as a top commercial secret and, therefore, should not be patented. Not all innovations are captured in patents, so patent numbers can underestimate innovativeness. Hence, other industrial research combines the number of patents with other quantitative data, such as the number of new product/services or new business models to measure the innovation performance of a firm. For instance, the Economic Observers (a well-known Chinese industrial medium) measures the innovation performance of Chinese firms based on the evaluation of patent files, number of new technology and products/services, new

market entrances as well as R&D department recruitment as parameters. The result of these combined indices can reflect a firm's overall innovation performance in a quantitative way; yet, the method only deals with one end of organisational innovation activities, that is, the result of the innovation activities.

2.4.3. Implications for this Research

The measurement methods discussed in this section have their own balance of advantages and disadvantages, and it seems none of them are absolutely superior to the others. The advantage of survey-based innovation measurements has been seen by Vergori (2014), as they can offer explanations of why and how different companies that offer similar products and services have a different quality in their product offerings. It is perhaps the advantage and, at the same time, the disadvantage of using qualitative data that it can cause biases due to the subjectivity of the qualitative data. The objectiveness of quantitative data can help to avoid biases by the examining of the facts.

Each of these innovation measurement methods was designed to serve the purpose of a specific type of research study or evaluation by focusing on specific areas of the innovation performance. Consequently, the innovation performance method that is going to be employed by this research should relate to the purpose of this research. As discussed before, the major issues with the automotive industry in China currently is that the automotive firms are not capable of producing advanced technology. The departments of the Chinese government, such as the NDRC, prefer to assess a firm's innovation performance using the number of patents as this is believed to be a direct reflection of the capability to develop new technology despite it not showing the full picture of the innovativeness of a firm. The limitation of such method is, as discussed before, that the R&D results which cannot be successfully commercialised are termed as invention rather than innovation. Hence, the number of patents can only reflect the innovativeness of a firm to a limited extent. The measurement method employed by the Economics Observer focuses on the technology side of innovation by considering the number of filed patents, the number of new products/services, and new market entrances as parameters. This seems to be more appropriate because the number of patents shows the R&D results while the number of new

products and new market entrances show the capability to commercialise the R&D results. This better relates to the definition of innovation in this research. The qualitative R&D survey method also fits the objective of this research, as it aims to evaluate the technological side of the innovation achievements. Therefore, the combination of number of patents as well as the qualitative R&D survey methods can give a more accurate evaluation of technological innovation that a firm has achieved. This is because a quantitative measurement can give an overview of a firm's innovativeness in more tangible terms, which is supported by the more detailed qualitative data, eventually yielding a clearer picture of the level of innovativeness

2.5. Conclusion to this Chapter

Almost a century ago, Schumpeterian theories pointed out that innovation holds the key to the competitiveness of entrepreneurs and economic growth as a whole. With the recognition of the significance of innovation, much efforts have been made to explore and understand innovation. In this chapter, some well-established theories on innovation are reviewed. Important implications have been drawn from the reviewed innovation theories. Based on these implications, a number of factors that influence the innovation performance of a firm were concluded. These factors are summarised and presented in Table 2.1.

Table 2.1: Summary of Factors that Influence Innovation

Factors	Description
Strategic Focus on Innovation	The strategic focus on innovation guides a firm towards an innovation-driven strategy, which defines the purpose of a firm, as suggested by both the concept of innovation culture and strategic intent (Katz, 2003; Hamel and Prahalad, 1989). Therefore, the strategic focus on innovation enhances the innovation performance of a firm.
Commitment of Organisational Resources	Resources are taken as the basis of innovation activities. Hence, despite the risk of resource investments on innovation as suggested by Tidd et al. (2005), the corporate strategy towards innovation needs the commitment of organisational resources to achieve specific innovation goals (Katz, 2003; Estrin, 2009; Hamel and Prahalad, 1989).

Accessibility to External Resources	The evolution from the integrated model of innovation to the system integration and networking represents the shift of attention towards external collaborations (Rothwell, 1994; Nobelius, 2004). External collaboration can allow extra resources to a firm that improve the likelihood of innovation results. Similar arguments are made by other innovation theories, such as the Open Innovation theory and Innovative Milieu. Hence, the accessibility to external resources is taken as a factor that influences the innovation performance of a firm.
Marketing & Industry as Drivers	Both the need of the market and technology advancement are driving forces behind innovation activities as suggested in innovation process models (Rothwell, 1994; Nobelius, 2004). Therefore, the observation of both market and industry is taken as a factor to build up a good innovation capacity.
A Process of Innovation	Innovation itself is a process of turning resources into commercially valuable results (Schumpeter, 1934; Freeman, 1982). As suggested in the innovation process models, the actual process of innovation of a firm can impact the innovation (Rothwell, 1994; Nobelius, 2004). Hence, the process of innovation of a firm is taken as a factor that influences the innovation performance of a firm.

In conclusion, there are five factors that were established from the current literature. These factors are suggested by the current literature to be the factors that influence the innovation performance of a firm. These five factors can be further classified into a number of categories based on the areas of focus. The categorisation of these factors and the logic behind the categorisation is presented in Table 2.2.

Table 2.2: Categories of Themes and Factors

Categories	Factors	Description
F1: Innovation Environment	**F1.1:** Strategic Focus	The strategic focus of the senior leadership and the commitment of organisational resources together create an innovation-friendly environment, which supports innovation.
	F1.2: Resource Commitment	
F2: Resources Accessibility	**N/A**	Acquiring external resources, such as external technology, ideas, knowledge, and R&D capability is important to build up innovation capacity of a firm.
F3: Innovation	**F3.1:** Market & Industry as Drivers	The process of generating innovation is driven by the understanding of both the need of the

Process	**F3.2:** A Process of Innovation	market and industry development. This process plays an important role in innovation activities.

This research finds that the three categories represent three main themes in understanding a firm's innovation behaviour. These themes and factors will be taken forward as the theoretical basis of this research, and this research will understand the innovation behaviour in accordance to these factors.

Other than the factors that influence innovation, it is necessary for this research to assess how much innovation is being generated by the automotive firms in China. Therefore, this chapter also reviewed some theoretical innovation performance measurement methods. Current literature suggests that in measuring the innovation performance of a firm, there are qualitative and quantitative methods that serve different areas of focus. Both qualitatitive and quantitative methods have their balance of advantages and disadvantages. Considering the focus of this research, the combination of both qualitative and quantitative methods can generate relatively clearer results. Therefore, this research will measure the innovation performance of IJVs as well as other firms using the combination of both qualitatitive and quantitative methods.

As discussed previously, innovation holds the key to the sustainable economic growth of China. It is the same with the development of China's automotive industry. Currently, the major issue with China's automotive industry is that the local automotive firms are not capable of delivering technologies that can compete with those of the automotive MNCs. Therefore, the Chinese government has been issuing policies in order to encourage international collaborations between local firms and MNCs. Specifically in the automotive industry, the form of IJV is strictly required. The reason behind such an insistence on IJVs reflects the hope that the local automotive firms can access the resources and learn from the highly capable automotive MNCs in order to develop the indigenous innovation capacity of automotive industry in China.

Considering the factors that influence innovation (**F1–F3**), it seems that this strategy of government is supported by the current innovation. This is primarily because the

collaboration with MNCs improves the resource input in the innovation activities, which in turn can potentially enhance the innovation performance. Also, the organisational learning from MNCs can have a positive influence on the environment of innovation as well as the innovation process of the local firm. Hence, at this point, it seems that the collaboration with MNCs can indeed be taken as a means to enhance the innovation capability of local firms. However, the features of international collaboration with MNCs, especially in the form of IJVs, have not been discussed from a theoretical perspective so far. Taking note of this, the next chapter will to look at the current literature on international collaboration and international joint ventures in order to further understand the theoretical basis of the Chinese government's insistence on IJVs.

Chapter 3: Literature Review on International Joint Ventures

As discussed in previous chapter, innovation is significant at both firm and economic levels. The central government in China has been actively pushing the enhancement of the innovation capacity of local firms in the hope that they can contribute to the sustainable growth of the local economy. Particularly in the automotive industry, the Chinese government's strategy is to encourage the collaboration between the local automotive firms and automotive MNCs in the form of IJV partnerships.

It was concluded in the previous chapter that innovation represents a process of generating new and commercially valuable products/services. Such process is driven by both market needs and scientific development and is implemented by the input of resources. Three main factors (**F1–F3**) that influence the innovation performance of a firm are concluded from the review of the literature on innovation. These factors are considered as the theoretical basis of understanding innovation behaviour. Upon reviewing these factors (**F1–F3**), it is found that the collaboration with MNCs can have positive impacts on these three factors and, hence, can be potentially beneficial for the enhancement of indigenous innovation.

In light of this, this chapter will focus on understanding the extent to which collaboration with MNCs, especially in the form of IJVs, contributes to the development of China's indigenous innovation capability. The relevant literature will be reviewed in accordance to the factors concluded in the previous chapter as to better understand the innovation behaviour in IJVs.

3.1. The Role of MNCs in Driving Indigenous Innovation

The role of MNCs in enhancing the indigenous innovation capacity of China is clearly recognised by the central government of China (APCO, 2010). The Chinese government's motivation for encouraging international collaboration between local

firms and MNCs is to allow local firms the opportunity to access and learn from MNCs' technology and managerial knowledge in order to ultimately enhance their innovation capacity. In fact, accessing resources and establishing organisational learning are argued to be the main motivations for forming international collaborations with MNCs (Inkpen, 2000). In view of this, this section will focus on how the collaboration with MNCs can influence the indigenous innovation in China.

3.1.1. MNC's Capacity to Influence the Innovation

It is recognised by the literature that working closely with MNCs increases the likelihood of generating innovation output (Zhao and Zhang, 2010). The current literature has found a number of features of MNCs that can facilitate innovation. To summarise from the literature, these key features are advanced managerial and marketing know-how, the capability of cutting-edge technology and R&D capability as well as a substantial supply of financial resources (Zahra et al., 2000; Fu et al., 2011; Lazonick, 2004).

As discussed before, the access to more input of resources by engaging in a collaborative innovation system improves the likelihood of generating innovation. In this respect, the highly advanced technology and R&D capability of MNCs seem to provide a feasible source of external resources and collaboration in the innovation activities. This is especially true considering that the main issue with the local firms is their lack of technological capabilities. In fact, a number of literature have found a positive relationship between technology/knowledge inflows and the innovation capability of local Chinese firms (Xu, 2011; Hou, 2011; Su et al., 2013). Wulf (2008) states that acquiring external knowledge and technology can provide the starting point of innovation activities to a firm with limited technological capabilities. Indeed, it is found that the Chinese firms rely on the acquired external technology in their own innovation process (Wulf, 2008). The integration of a firm's own technology with the absorbed capability from MNCs creates innovation results (Su et al., 2013). Additionally, the entry of MNCs has also promoted growth in R&D alliances and collaboration in China (Minin and Zhang, 2010). This is because collaborative R&D development creates win-win opportunities for both MNCs and local firms which motivate the involved firms to innovate collaboratively (Minin and Zhang, 2010).

However, there can be intellectual property (IP) issues that obstruct collaborative innovation activities in international collaborations. The current literature suggests that IP protection plays an important role in collaborative innovation activities (Helpman, 1993; Fagerberg et al., 2005). A tightened IPR protection mechanism motivates the involved firm to engage in innovation activities and vise versa (Okawa, 2010). In this respect, there is evidence to suggest that China has been making progress in strengthening the laws to protect the IPR (Li, 2012). However, China's IPR protection mechanism is still criticised as the enforcement of the laws has not been effective, especially when it comes to the conflict between local firms and foreign firms (Ju et al., 2013; Li, 2012). Consequently, there are cases when the MNCs' IP are misused (e.g. Gong, 2004; Edmondson, 2007). Such an IPR issue in China is widely recognised by MNCs and hence, they are sensitive about bringing their IP into China (Ju et al., 2013), which can potentially limit the collaborative innovation activities in China.

On the other hand, the acquisition of resources from MNCs does not always happen on its own, but requires significant, well-directed efforts as well as the absorptive capacity (the ability to absorb and utilise knowledge/resources) of the receiving firm (Fu et al., 2011; Camison and Lopez, 2012). In this respect, the managerial experience and know-how of MNCs, including business operation, management, production techniques, and R&D process can also have positive impacts on the local firm's organisational structure which improve the absorptive capacity. The current literature found a two-way impact on the organisational structure of the involved parties. The local firms learn from the highly efficient organisational structure that large MNCs use to deliver superior performance, while the MNCs adapt to the local business environment by making a change to the organisational structure (Wu and Pangarkar, 2006; Wen et al., 2010). In a collaboration, the local firms tend to learn from the organisational structure, including the management, the production, and R&D process that were well established by the foreign firms and adapt them with their substantial local knowledge (Liang, 2008). The opportunity of collaboration gives the local and foreign firm the mutual benefit of influencing and learning from each other and ultimately improves the organisational efficiency and absorptive

capacity of both parties (Li and Yue, 2005). As a consequence of this, the local firm can better absorb and utilise the inflow of resources and innovate better (Li and Yue, 2005).

3.1.2. Implications for this Research

The current literature supports the idea that the international collaboration with MNCs can enhance the indigenous innovation in China. This is because, firstly and most notably, in the collaboration with MNCs, the local firms can be exposed to the highly advanced technology and R&D process of MNCs. Considering the limited technological capability of some Chinese firms, the inflow of MNCs' technological resources are significant to local firms, as it can give the local firms the starting point of innovation activities, which in turn benefits their independent innovation capacity. In fact, this can perfectly explain the reasons why the automotive MNCs that operate IJVs in China are required to transfer some of their technology to their IJV partners at a certain stage of the IJV operation. It was discussed in the previous chapter that the inflow of resources can influence the innovation performance of a firm (concluded as **F2**). In this sense, the suggestion that the collaboration with MNCs can enhance the indigenous innovation seems to perfectly align with the basic suggestions of some innovation theories, such as *Open innovation* theory. However, it is also speculated that the MNCs can have concerns over their IP in the collaboration due to China's unsound IP protection mechanism, which limits their willingness to contribute certain resources to the IJVs that would be necessary for innovation activities.

On the other hand, it was established in the previous chapter that the actual process of innovation can also influence the innovation performance of a firm (concluded as **F3**). In this respect, the collaboration with MNCs can influence the organisational structure of the local firms and lead it towards a more efficient one. Such improved efficiency in the areas of business operation, including management, R&D as well as production process can positively impact the innovation performance, as innovation is a process from invention to exploitation. Therefore, the literature on international

collaboration and its effect on enhancing indigenous innovation seems to also align with innovation theories to some extent.

However, the literature does not seem to suggest that the collaboration with MNCs can have positive/negative impacts on the creation of an innovation-friendly environment (concluded as **F1**). Instead, the literature only seems to imply that the collaboration with MNCs can promote collaborative innovation activities, which benefit the involved parties. Hence, it cannot be concluded that collaborating with MNCs can/cannot create an innovation-friendly environment for local firms.

As a conclusion to this section, the collaboration with MNCs is suggested by the current literature as a means of enhancing indigenous innovation capacity in China. In fact, there can be a number of ways of establishing international collaborations with MNCs. The next section will focus on exploring IJVs as a means of driving indigenous innovation in China to understand the government's IJV-innovation strategy.

3.2. International Joint Venture (IJV) as an Innovation Driver

The previous section established the role of MNCs in enhancing the indigenous innovation in China. In forming international collaborations, IJV partnerships are strictly required in the automotive industry in China. As discussed previously, the Chinese government mainly sees the IJV partnership as an effective platform of exchanging resources and inter-organisational learning. Taking this into account, this section will focus on exploring the features of IJVs that drive the indigenous innovation in China.

3.2.1. IJV as a Form of International Collaboration

Empirical research provides a number of business models that allow a firm to form international collaborations with MNCs. Tedeva and Knoke (2005) listed a number of models of international collaboration and the key feature of these models (Table 3.1.). According to Tedeva and Knoke (2005), there are a variety of ways of establishing an international collaboration. These modes have distinct features, as

shown in the table. It was established earlier that the ultimate goal of establishing IJVs represents the enhancement of indigenous innovation capacity in China. In this sense, it seems that an IJV is not the only possible option on the list. Other than IJVs, the acquisition of other companies (hierarchical relations); the licensing agreement, and the R&D consortia can also potentially achieve the ultimate goal of the government.

Table 3.1: Models of International Collaboration

Hierarchical Relations	Through an acquisition or merger, one firm takes full control of another's assets and coordinates actions by the ownership rights mechanism
Joint Venture	Two or more firms create a jointly owned legal organization that serves the purpose for its parent companies
Equity Investment	A majority or minority equity holding by one firm through a direct stock purchase of shares in another firm
Cooperatives	A coalition of small enterprises that combine, coordinate, and manage their collective resources
R&D Consortia	Inter-firm agreements for research and development collaboration, typically formed in fast-changing technological fields
Strategic Cooperative Agreements	Contractual business networks based on joint multi-party strategic control, with the partners collaborating over key strategic decisions and sharing responsibilities for performance outcomes
Cartels	Large corporations collude to constrain competition by cooperatively controlling production and/or prices within a specific industry
Franchising	A franchiser grants a franchisee the use of a brand-name identity within a geographic area, but retains control over pricing, marketing, and standardized service norms
Licensing	One company grants another the right to use patented technologies or production processes in return for royalties and fees
Industrial Standards Group	Committees that seek the member organizations' agreements on the adoption of technical standards for manufacturing and trade
Action Sets	Short-lived organisational coalitions whose members coordinate their lobbying efforts to influence public policy making
Market Relations	Arm's-length transactions between organizations coordinated only through the price mechanism

Source: Tedeva and Knoke (2005)

In fact, there has been a few acquisitions of international automotive firms. For example, Geely holding (a Chinese automotive firm) acquired Volvo in 2010, and SAIC

group acquired MG Rover in 2010. As a consequence, the Chinese companies acquired all of the assets of these international companies. Perhaps the most important assets for enhancing innovation represent the R&D capability and technologies of these firms. These can directly be utilised in the local innovation activities, which can explain why the central government of China has been pushing the acquisition of international companies.

However, the reality is that there has been a limited number international automotive firms that can bring benefit to the enhancement of indigenous innovation. Moreover, the major automotive MNCs that have a substantial amount of technological resources and R&D capability cannot be realistically acquired by Chinese firms. Additionally, the licensing does not seem to fundamentally address the issue of a lack of technological capabilities. This is because the licensing agreement only gives the local firm the technology rather than the innovation capability. Last, due to the lack of technological capabilities, Chinese automotive firms cannot realistically engage in an international R&D collaboration.

Instead, the IJV seems to be a more practical way of establishing a platform of exchanging resources and organisational learning. In fact, IJVs are generally defined as a collaborative business unit between at least two firms with at least one of the involved firms headquartered outside of the host country (Yan and Luo, 2001; Geringer and Hebert, 1989). Empirical research recognises several advantages of the IJV partnership as a form of international collaboration. This covers the fast access to an unfamiliar market due to risk sharing with the local IJV partner, better access to resources as both parties put complementary resources together to form and operate an IJV, and new insights and expertise as a consequence of complementary resources and capabilities (Gong et al., 2005; Nam, 2011; Yan and Luo, 2001). On the other hand, the disadvantages include the dilution of profits as well as difficulties with human resource (HR) management, which are also recognised by the current literature (Nam, 2011; Gong et al., 2005).

An IJV represents one form of an international collaboration, yet perhaps the defining feature of an international joint venture is that it involves creating a collaborative business unit jointly owned by the two firms involved (Nam, 2011). In order to form

and optimise the performance of the IJV, the parent companies usually combine and contribute their resources, such as financial, technological, managerial, and personnel resources to the collaborative business unit (Gutterman, 2009). For this reason, an IJV company is considered to benefit from the resources and specialty of the two companies.

Based on the review of the current literature, this research finds that a joint venture can enhance the innovation performance of the parent companies due to the complementary resources and capabilities of the parent companies. The complementary resources and capabilities of the parent companies can allow them the opportunity for mutual learning and allow new knowledge to be cultivated within the IJV.

3.2.2. Knowledge Creation in IJVs

As suggested before, the involved parties in an IJV combine the complementary resources and capabilities to form an IJV company. As a consequence of this, the IJV company can have direct access to the combined resources of the parent companies. It was established in the previous chapter that the accessibility to resources can influence the innovation of a firm. In this respect, the IJV partnership is argued to be able to deliver the innovation output due to the benefit of the resources from two parent companies (Zhao et al., 2005). In fact, the role of the direct access to the collaborative resources of the parent company in the innovation activities of an IJV company is highlighted by Inkpen (2000). The process through which an IJV company accesses the resources of its parent companies is referred to as the internalisation process (Inkpen, 2000). This process of internalisation mainly represents the transferring process of the resources and the utilisation process of the transferred resources (Inkpen, 2000). Yan and Luo (2001) also highlight the importance of internalisation in suggesting that the utilisation of the collaborative resources within an IJV partnership is a sequential three-step process, made up of a perception stage, an internalisation stage and an abstraction stage. They argue that the collaborative knowledge transferred was initially perceived and made sense of by the receiving party. Then the perceived knowledge allows the opportunity for both parties to internalise and make use of the acquired knowledge collaboratively. The ultimate

stage of the abstraction is to improve the capabilities of the parent companies based on their knowledge pool (Yan and Luo, 2001).

In an IJV, the utilisation of the collaborative resources can result in the creation of new knowledge as demonstrated by the model proposed by Pak et al. (2015). This model evaluates knowledge creation on the basis of the utilisation of collaborative resources in the context of IJVs. The model consists of four distinct stages that describe the flow of the acquired resources within a joint venture. The model is presented in the Figure 3.1.

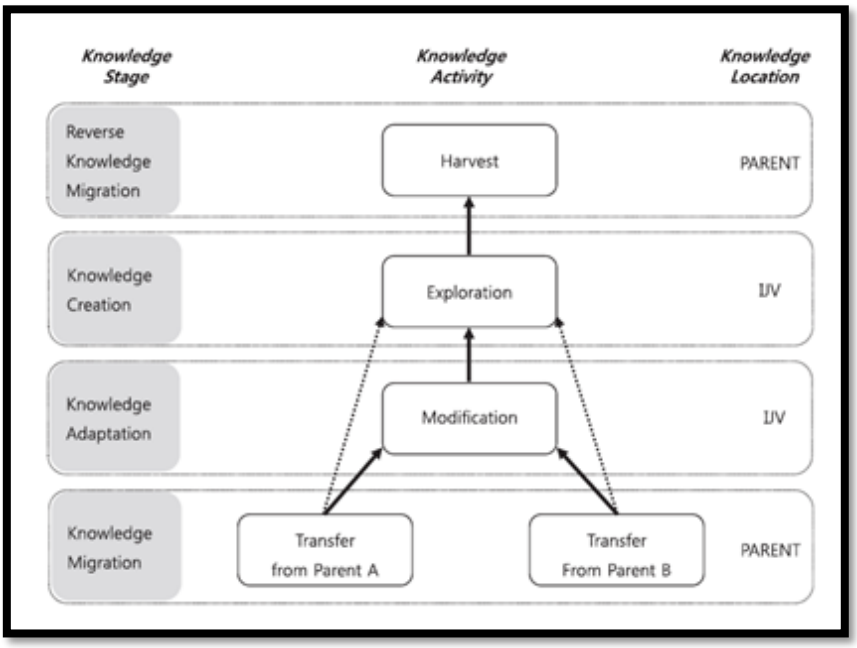


Figure 3.1: Multi-Stage Model of Knowledge Management in the IJV Context (Pak et al., 2015)

In the flow of knowledge, Pak et al. (2015) find that in an IJV, the existing resources migrate from the parent companies to the IJV in order to establish and make the collaboration work. On the basis of the existing technology/knowledge, an IJV company is found to then adapt and consume the replicated knowledge in order for the IJV operation to proceed. Pak et al. (2015) find that through the second stage, the IJV benefits from the opportunity to learn from the acquired resources and eventually create new knowledge:

> *...knowledge is created through an organisational learning process in which individuals of an IJV digest and combine different transferred knowledge via*

> *internalisation and socialization...The parent companies are collaboratively involved in exploring, leveraging and pursuing potential synergy by blending their resources, knowledge, and individual efforts in order to develop IJV-specific knowledge and competence* (Pak et al., 2015, p.183).

After the adaptation stage, the joint venture company is found to be able to create new knowledge of its own based on the collaborative resources. The evolution of the acquired knowledge in an IJV is also found by Pollitte et al. (2015) to be a significant step in knowledge creation and, therefore, the innovation process. In the final stage of the model proposed by Pak et al. (2015), which is referred to as the reverse knowledge migration stage, the IJV partnership will allow the parent company to harvest the valuable and, specifically, IJV-embedded knowledge from the IJV and further improve their own knowledge and capabilities (Pak et al., 2015). Such knowledge creation and feedback effects suggested by Pak et al. (2015) are also recognised by some subsequent research (e.g. Zheng, et al., 2018; William and Vrabie, 2018).

The model of Pak et al. (2015) seems to echo some innovation theories, as it stresses the significance of the collaborative resources and the process of utilising the acquired resources to generate innovation results. There are some important implications of the model of Pak et al. (2015). First, the model of Pak et al. (2015) have provided some insights into the innovation process in the context of IJVs. Second and perhaps more importantly, this model seems to have provided a theoretical framework of how an IJV partnership, as a model of international collaboration, can benefit the enhancement of indigenous innovation capacity (the innovation capacity of the local parent company). As discussed in the previous section, the empirical literature supports the idea that the collaboration with MNCs can enhance indigenous innovation, mainly due to the capabilities and resources of MNCs. However, the mechanism under which the capability of MNCs can influence and enhance the indigenous innovation has not been presented in a detailed theoretical framework. In the model of Pak et al. (2015), how an IJV partnership can create new knowledge and consequently benefit its parent company is presented from a theoretical perspective. Therefore, this model seems to provide some

theoretical background to explain the Chinese government's IJV-innovation strategy.

As a conclusion, the literature reviewed above seems to suggest that the IJV partnership can create new knowledge based on the consumption of the collaborative resources of the parent companies. This is in line with the theoretical suggestion that the local firm can access the resources of MNCs and innovate in collaboration with MNCs. However, although an IJV is generally considered to be able to access and utilise the resources from the parent companies, the nature of an IJV makes accessing the resources of the parent companies more complex than an ordinary subsidiary. The complexity of the IJVs will be discussed later in Section 3.3. On the other hand, the mutual learning effect is also recognised in the literature on international collaboration with MNCs. Hence, the next section will focus on the mutual learning effects in IJVs.

3.2.3. Inter-Partner Learning Effects in IJVs

As a form of international collaboration, IJV partnerships are recognised by the current literature as an effective platform for mutual learning between local firms and MNCs (Yan and Luo, 2001; Beamish, 2008; Inkpen, 2000). In establishing an IJV partnership, the involved parent companies bring together their resources, including operational, managerial, personnel, and technological resources. The resources from each parent company tend to be different in order to achieve resource complementarity. Therefore, the utilisation of the resources can enhance the inter-partner learning of all the involved parties in an IJV partnership (Yan and Luo, 2001). Beamish (2009) concluded that there are three ways in which the involved parties can benefit from the opportunity for mutual learning.

First, the involved companies usually contribute a mix of organisational experience, knowledge, and technology to the joint venture company. The combined resources are, therefore, made accessible to each other and sometimes exchanged in order to better operate the IJV, and this brings about the opportunity for learning from each other's resources (Beamish, 2009). Second, as the resources and competencies are combined and mixed in the joint venture company, the involved parties tend to

change and transform themselves in order to fully adapt and utilise the collaborative resources (Beamish, 2009). This process of transformation and adaptation can improve the understanding of both existing resources and newly acquired resources in the joint ventures, which ultimately generate new competencies through the joint venture partnership, such as managerial and operational knowledge (Beamish, 2009). Last and perhaps most importantly, the newly learned knowledge and experience on firm operation from the joint venture company are usually transferred back into the operation of the parent companies. This process is referred to by Beamish (2009) as 'harvesting'. The figure below demonstrates the process of mutual learning in simple terms.

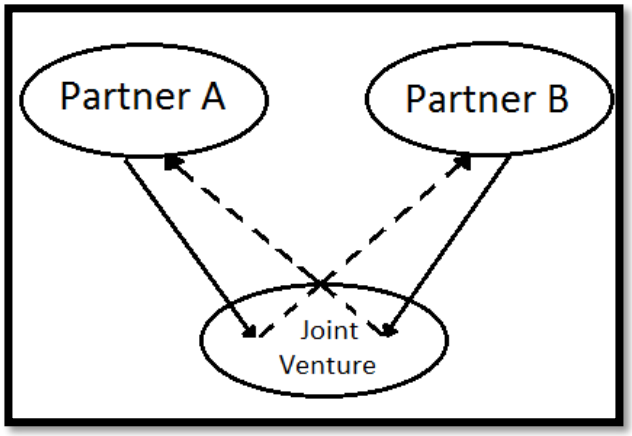


Figure 3.2: Mutual Learning Process under the Joint Venture Context (Beamish, 2008)

As it can be seen from the figure, the contribution of resources by each partner is shown with a solid line and the dotted line shows the process by which the involved parties harvest the learned new knowledge from the joint venture company. At this point, it seems that the IJV partnership can indeed allow the involved firms to influence and learn from each other, which consequently improves the capabilities of the involved parties.

3.2.4. Implications for this Research

The Chinese government has posed strict requirements on the establishment of IJVs in the hope that IJV partnerships with MNCs can enhance the innovation capacity of local automotive firms. The current literature on IJVs have provided some theoretical

support to the IJV-innovation strategy. Upon reviewing the current literature on the capability of IJVs to enhance innovation, this research finds that the theoretical suggestion between IJV literature and innovation literature basically align with each other. This alignment of theoretical suggestions can be seen from three main perspectives.

First, as an IJV represents the collaborative subsidiary of two parent companies, it can benefit from having direct access to the resources of its parent companies. The collaborative resources in an IJV partnership are adapted and modified in an IJV company. As a consequence, the IJV company is likely to create innovation results, which can benefit its parent company as well. The previous chapter on innovation literature would suggest that the accessibility to external resources via external collaboration can influence the innovation performance of a firm. In this respect, it seems that the logic basically aligns with **Factor 2 (F2)** concluded from the innovation theories that suggests that accessing more resources increases the likelihood of generating innovation outcomes.

On the other hand, from the perspective of the innovation process, it was discussed in the previous chapter that the actual process of innovation (concluded in previous chapter as **Factor 3**) can influence the innovation performance of a firm. As discussed before, none of the existing theoretical innovation processes can fully explain the process of innovation. Despite this, the multi-stage model of Pak et al. (2015) (discussed in Section 3.3.1) seems to bring some insights into the process of innovation in the context of an IJV. The multi-stage model of Pak et al. (2015) suggests that an IJV adapts to the acquired resources from its parent companies by modifying them to suit the condition of the IJV company. Through such acquisition and modification of the collaborative resources from parent companies, innovation results can be generated. The stages of acquisition and modification of resources are deemed by Pak et al. (2015) as the resources migration stage and the resources adaptation stage respectively. Based on this, the process of innovation (**F3.2**), in the context of IJV, can be expanded and include **F3.2** (Resource Migration Stage) as well as **F3.3** (Resource Adaptation Stage).

Additionally, the literature suggests that an IJV collaboration allows the involved

parties the opportunity for inter-partner learning at the organisational level, which improves the organisational efficiency of both parties. Consequently, this improves the capabilities of the involved parties to utilise resources and ultimately increases the innovation performance as well. This logic too aligns with **Factor 3 (F3)** as an efficient organisational structure influences the innovation process and, therefore, can improve the innovation performance of a firm. Thus, **F3.4** (Mutual Learning Effects) is added to **Factor 3** (Innovation Process) in order to better understand the innovation phenomena in the context of IJVs.

Despite the advantages of IJVs in building up innovation capacity of a firm, the current literature also finds that the complexity of IJVs can cause instability issues, which consequently limits the performance of IJVs and their effectiveness as an innovation driver. Zhou and Li (2008) support this idea by stating that the innovation achievements in IJVs reflect the effectiveness of the collaboration, including mutual trust, co-management, and IJV control between the parties as well as the complementary resources of both parties (Zhou and Li, 2008). Therefore, the next section will evaluate the effectiveness of an IJV as an innovation driver by looking at the factors that cause instability issues and obstruct the innovation process.

3.3. The Instability Issues in International Joint Ventures

As discussed above, what makes an IJV different from an ordinary subsidiary is that an IJV represents the contractual 'child' of more than one company. Although the IJV partnership is seen as both a medium for accessing the resources of the parent companies and a platform for inter-partner learning, the nature of IJV partnership brings in considerable complexity to the cooperation. Yan and Luo (2001) describe the complexity in the IJV partnership in terms of 'internal inter-organisational relationships'; specifically, the complicated relationship between the IJV and its foreign and local parent companies. In fact, a large percentage of IJVs experience difficulties in both co-operation and collaboration (Gutterman, 2009). The existing literature refers to this as instability issues within an IJV.

The instability of IJVs can cause difficulty with its operation or even the collapse of

the partnership (Yan and Luo, 2001), which limits the effectiveness of IJVs as an innovation driver. The instability issues of IJVs are the direct results of the nature of the IJV partnership. The common reasons for such instability issues include the following: cultural issues as the parent companies come from different host countries and have different organisational cultures; the management and control styles of the parent companies as well as the suitability of the parent companies in the first place, which includes the consideration of the strategic focus and resources capabilities; and the external forces, such as the overall economic conditions of the host country of the IJV company (Yan and Luo, 2001). Despite the possibility that these factors can cause instability in an IJV, they are also, conversely, the success factors of IJVs. That is, if the partners are a suitable match and have strategic objectives that are complementary to each other, then the IJV has a higher likelihood of being stable and successful (Yan and Luo, 2001). Instability issues can cause failure or termination of the IJVs and certainly limit the innovation performance that can be achieved by IJVs. Therefore, this section discusses the factors that contribute to the stability/instability of IJVs.

3.3.1. Suitability of the IJV Partners

Essentially, having a good IJV partner is the highest priority for establishing a successful IJV. A good foreign partner can bring the IJV a substantial amount of resources, such as technology and managerial experience (Luo et al., 2001). A good local partner can also reduce the political risks, gain political support and avoid possible difficulties in the host country by accessing local knowledge (Tian, 2007; Luo et al., 2001). On the other hand, the wrong selection of a joint venture partner can result in issues in the operation of IJVs, such as internal competition in the IJV and conflicts over control of the IJVs (Geringer, 1991; Luo et al., 2001), which causes instability to the IJVs.

Current literature has provided a number of joint venture partner selection criteria and factors to increase the likelihood of success in an IJV operation. The methods include the early literature of Geringer (1991), which suggests a two-fold typology focusing on accessing the partner's capability as well as the partner's effectiveness of operation; Li's method (2001), which adds an extra fold to the classic method by

assessing the financial aspects of the partner; the method by Luo et al. (2001), which evaluates the financial, cultural and strategic traits as well as the organisational traits; and the most recent method by Tian (2007), which measures the capacity of a firm by considering its customer base, social network, corporate image, and financial strength. In addition, there are Hoffmann and Schlosser's (2001) factors, which focus on more specific partner-related factors. Table 3.1 below summarises these established criteria.

Table 3.2: Summary of Theoretical Partner Selection Criteria

<table>
<tr><th>Geringer (1991)</th><th>Li (2001)</th><th>Luo (2001)</th><th>Tian (2007)</th><th>Hoffmann and Schlosser (2001)</th></tr>
<tr><td rowspan="2">Task-related</td><td rowspan="2">Strategic fit</td><td>Strategic traits</td><td rowspan="4">Capacity fit</td><td rowspan="2">Complementary contribution</td></tr>
<tr><td>Financial traits</td></tr>
<tr><td rowspan="2">Partner-related</td><td rowspan="2">Financial fit</td><td rowspan="2">Organisational traits</td><td>Value and cultures</td></tr>
<tr><td>Organizational fit</td><td>Cultural traits</td><td>Presence of trust and excellence in the cooperation</td></tr>
</table>

The original criteria suggested by Geringer (1991) have consequently been further developed by later researchers. Yet, the fundamental argument of all these research papers is that, if the benefit of an IJV is to be maximised, the involved firms should have a common strategic goal and complementary strength.

In fact, the complementary strength of both local and foreign parties is regarded as a critically important factor for the success of IJVs (e.g. Geringer, 1991; Yan and Luo, 2001). The complementary capabilities of the involved parties are argued to be the fundamental reason for the establishment of IJVs (Geringer, 1991). Yet, the complementary resources of the involved parties can also impact the strategic expectation and cause instability issues. Beamish (2008) examines the stabilities of an IJV based on what each party expected to achieve through its joint venture partner. Beamish (2008) argues that if one partner aims to acquire the knowledge from another partner, the IJV tends to be unstable, whereas accessing each other's knowledge for the mutual benefit of both partners leads to the stability of a joint

venture, as summarised in Table 3.2.

		Parent A	
	What do you want from your partner?	Wants access to partner's knowledge	Wants acquisition of partner's knowledge
Parent B	Wants access to partner's knowledge	The classic 'joint' venture -A cooperative alliance (Very Stable)	Mixed Motive -A pseudo alliance (Eventually unstable)
	Wants acquisition of partner's knowledge	Mixed Motive -A pseudo alliance (Eventually unstable)	"Race to win" -A competitive alliance (Very Unstable)

Table 3.3: The Expectation and Stability of an IJV (Beamish, 2008)

It seems that the model suggested by Beamish (2008) provides three possible scenarios and the stability of the IJV under each scenario. As shown in the table, the worst scenario is the 'race to win' situation, in which the involved parties both expect to acquire the each other's resources, which causes internal competition. Beamish (2008) sees this type of joint venture as highly unstable. In contrast, the classic 'joint' venture as referred to by Beamish (2008) is considered highly stable, as the collaboration is cooperative rather than competitive.

The suitability of the involved parties can increase the likelihood of the success of the IJV. Important factors for the suitability of the partners are mainly represented by the common strategic goals and complementary capabilities. An inappropriate partner selection can result in the instability of an IJV, which limits the cooperation and performance of the IJV and in turn limits the potential innovation performance of the IJV. However, in the context of automotive IJVs in China, the local automotive firms and automotive MNCs can have common and different strategic goals. Possible common strategic goals can include gaining the market share and profit in China. Other than this, the local partners also expect to improve their own technological and innovation capability through accessing the resources of MNCs and learning from MNCs. From the perspective of the foreign parties, accessing the local

knowledge and perhaps, most importantly, gaining permission from the Chinese government represents their major expectations. The different strategic goals of the involved parties can also mean the complementary strengths of the involved parties, which also form the basis of mutual benefit, an important stability factor in itself for an IJV. That is, because most of the local automotive firms are state-owned, they can get political support from the governments for the IJV and its activities, while the automotive MNCs are generally capable of contributing the advanced technologies that the local companies need. In this respect, the local automotive firms and automotive MNCs seem to naturally have complementary resources. Nevertheless, it is recognised that an IJV party is established to fulfil the purpose of its parent companies (Yan and Luo, 2001; Geringer, 1991). Therefore, the strategic focus of the IJV company is influenced by the strategic goals of its parent companies.

Other than the common strategic goal and complementary capabilities, the culture can also have impact on the stability of an IJV. In fact, in most of the automotive IJVs in China, the differences in both national and organisational cultures are inevitable as the automotive MNCs mostly come from Europe, Japan, and America, where there are different national cultures. The next section will focus on the impacts of culture on the stability of IJVs.

3.3.2. The Impact of Culture on IJVs

Another potential problem with IJVs are the cross-cultural issues, which can cause instability in the IJVs and, therefore, limit the performance and co-operation in the IJVs. The involved parties in an IJV come from different host countries by definition and, therefore, have different national cultures. An IJV serves the interests of two (at least) parent companies, which also brings together different organisational cultures. In fact, during the formation of an IJV, the organisational resources including technology, knowledge, and personnel resources, along with the national and organisational culture, are transferred to the IJV (Schein, 1992). The different national and organisational cultures in a collaboration can cause internal conflicts, which leads to the ineffectiveness of the collaboration and ultimately limits the performance of the IJV. In fact, Pothukuchi et al. (2002, p.245) observed that conflicts arose within the empirical example of IJVs:

Cross-national joint ventures have been reported to suffer from communication, cooperation, commitment and conflict resolution problems cause by partners' value and behaviour differences, which in turn cause interaction problem that adversely influence the joint venture performance...

It is understandable that a business venture involving two completely different organisational and national cultures will have conflicts. Unavoidably, people from different cultural backgrounds see certain affairs differently and make different judgments or decisions (Li et al., 2001; Weber and Hsee, 1999). Similar issues arise with organisational culture issues, as this is built up over years of independent development (Yan and Luo, 2001; Beamish, 2008). Cartwright and Cooper (1993) point out that a good match of the cultures can generally raise the chances of success. A similar argument is made by Gomez and Palich (1997), who state that the impact of culture can be either positive or negative depending on the level of similarity between the involved cultures, whereas Meschia and Ricciob (2008) argue that large cultural distances can result in a high degree of instability in an IJV.

However, the current literature also suggests that having two completely different cultures that do not fit with each other within an IJV does not necessarily lead to the failure of an IJV. The possible scenario is that one of the parent company's cultures dominates the IJV or neither of the two (at least) cultures dominate, which can result in either the failure of the IJV or the formation of a 'third culture' (Schein, 1992; Salk and Shenkar, 2001). The third culture represents a new culture that exists only within the IJV as a consequence of the mutual understanding and harmonious collaboration of the involved parties (Salk and Shenkar, 2001). The third culture also reflects the results of the inter-partner learning. A number of frameworks were developed to understand the issues in a cross-cultural environment. Hofstede's (1984) *Dimension of National Culture* and the model presented by Trompenaars and Hampden (1997) typically researched ways in which the differences in cultures should be measured. The important implications of these two models is that both national and organisational cultures can be understood and utilised to improve the effectiveness of co-operation, which ultimately leads to the success of the IJV. Therefore, understanding the Chinese culture is important for understanding the stability or

instability of the automotive IJVs in China.

Specifically, as the Chinese culture is influenced by thousands of years of Confucius culture, it takes the social relationship among people as the most important attributor to daily life and work (Zhao, 2005). Chinese people tend to believe in commonality rather than individuality as in Western culture and, therefore, rely on collective wisdom rather than individual wisdom (Zhao, 2005). In addition, in Chinese culture, people are considered to be the most important element in everyday life, and the rules or laws are designed to serve the need of people (Zhao, 2005). The Chinese expression of 'Guanxi', which is the equivalent of social relationships with people in Western culture, represents the core value of Chinese culture (Fan, 2002). Building up an adequate network of Guanxi can considerably improve the efficiency of conducting business in China. This is because a close relationship with a business partner or government official can allow a business a great deal of flexibility in avoiding unnecessary bureaucracy, which significantly improves efficiency in doing business (Su et al., 2006). Although Fan (2002) believes that the tool of 'Guanxi' is not as powerful as it used to be following economic and legal reform of China, the social relationship with people, which is deeply embedded in the minds of Chinese people, is still the dominant factor in business in China (Zhao, 2005; Brennan and Wilson, 2010).

Although it seems that cultural issues can lead to the instability of IJVs, which in turn limits the performance and operation of a joint venture, one important implication of Chinese culture for this research is the utilisation of the cultural tool of Guanxi, as it can increase the likelihood of the harmonious and efficient operation of IJVs. In fact, Western firms in China with a large percentage of local talent tend to be more successful because the local employees provide Guanxi resources to the firms (Tao, 1996). Another important implication of Guanxi in this research is that although the local Chinese automotive firms, in general, are not capable of providing substantial knowledge or technology resources, they can offer a great deal of Guanxi resources as a complementary contribution to an IJV. This can improve the stability of the automotive IJVs in China. For example, while automotive MNCs can provide highly advanced technology, the local partners can provide political support to the IJV,

which is also important for the operation of the IJV.

3.3.3. Management and Control of IJVs

The effectiveness of cooperation between the involved parties is also found to have a significant influence on the stability/instability of IJVs. The complex nature of IJVs makes management and control rather different compared to a conventional company due to the involvement of at least two parent companies. The mechanism of control over the IJVs can sometimes result in instability. For example, Le (2009) finds that in the early stage, if the performance of an IJV falls below expectations, the foreign firm tends to control the business more tightly because the MNCs have more knowledge, experience, and technology than the local partner. Yet, such behaviour would create an atmosphere of competing for control, which causes tension and results in distrust among the involved parties and, eventually, limits the effectiveness of the cooperation of the parties involved (Le, 2009; Li et al., 2011). Therefore, such control is referred to as negative control by which one or two parties actually put a barrier on the implementation and development of the IJV company (Li et al., 2011; Geringer and Hebert, 1989). In contrast, positive control, as suggested by Geringer and Hebert (1989), promotes cooperation and enhances the performance of IJVs.

Early studies suggest that one of the ways of achieving positive control over IJVs is by using what is referred to by Geringer and Hebert (1989) as the 'dominant controller'. Under this mechanism, there is always one party that dominates the control of the joint venture. The reason for employing a dominant controller mechanism is noted by Geringer and Hebert (1989).

> *Dominant control is a mechanism for reducing the risks associated with coordination, potential conflicts, and disclosures and, consequently, for minimizing transaction costs and stabilizing the IJV. (Geringer and Hebert, 1989, p.35)*

Under such a control mechanism, where one party concedes control to the other party, both parties can benefit, as the IJV does not suffer from an inefficient collaborative decision-making process and avoids potential conflicts. A later IJV control mechanism introduced by Yan and Luo (2001) looks at the control over an IJV

on the basis of the operations process as well as the decision-making process. They recommend an 'equally shared control' model for the equally shared IJVs, which allows the parent companies to take responsibility for separate functional lines (Yan and Luo, 2001). Li et al. (2011) pushed the theory forward by proposing the 'Shared but Split Control' model (Figure 2), particularly for the automotive IJVs in China. According to their research, the shared-but-split model allows both partners to influence all departments of the IJV company while each parent retains tight control over specific areas of the business where they have a comparative advantage.

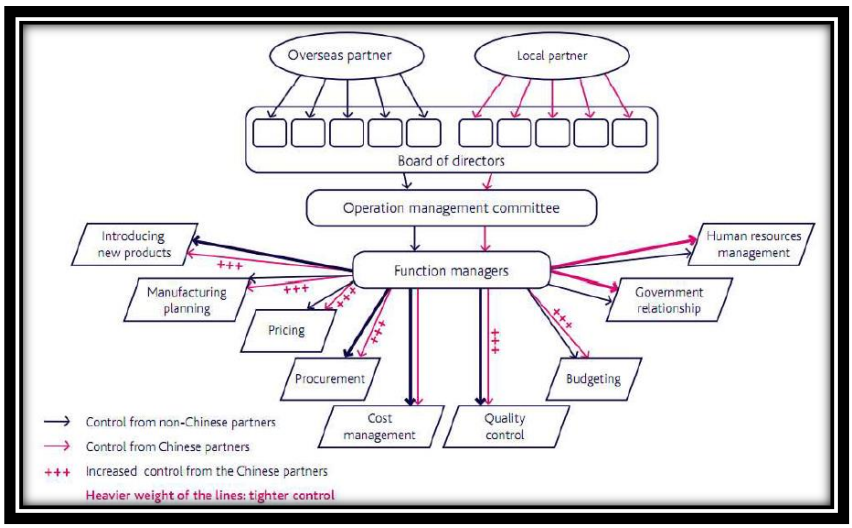


Figure 3.3: Example of the Shared-but-Split Control Model (Li et al., 2011)

As can be seen from Figure 3.3, the foreign firm has a tighter control over the technical aspect of the automotive IJVs while the Chinese partner's emphasis is focused on the personnel as well as the social network aspects of the IJV. This also echoes the significance of the complementary strengths of the involved parties. At this point, the important implication is that the mechanism of management and control over an IJV can create potential instability issues for the IJV. However, the current literature has suggested some solutions for the control mechanism to reduce the possibility of instability in IJVs, and therefore, the IJV management must decide on the control mechanism best suited to meeting their requirements in each particular scenario.

3.3.4. Implications for this Research

As discussed in the previous section, the logic behind the idea that an IJV can drive

innovation activities seems to basically align with the suggestions of innovation theories. However, it is established in this section that an IJV company is different from an ordinary company and there can be instability issues with the IJVs. There can be a number of factors that obstruct the effectiveness of the co-operation and cause instability issues in an IJV, which consequently influences the innovation performance of an IJV. Specifically, the suitability partner, the culture of involved partners and the management, and control mechanism of the involved parties can cause issues of ineffective co-operation or even failure of the IJV.

Therefore, this research finds it necessary to consider the stability of an IJV prior to looking at its innovation behaviour. Thus, this research concludes **Stability of IJV** as the fourth factor (**F4**) that specifically influences the innovation performance of an IJV company. In examining the stability of an IJV, this research will examine the **Suitability of Partners (F4.1)** to explore whether the involved companies have complementary strengths and other **Instability Factors (F4.2)** to explore if there exist any other factors that might obstruct the effectiveness of co-operation, such as factors concerning culture and/or management and control.

On the other hand, it was concluded in the previous chapter that the strategic focus on innovation (**F1.1**) and the commitment of organisational resources (**F1.2**) for innovation activities together creates an innovation-friendly environment (concluded as **F1**), which positively influences the innovation performance of a firm. In this respect, the strategic focus of the joint venture company is rather influenced by the expectation of both parent companies. Even though the common strategic goals are suggested by the current literature as a standard for a suitable partner, it is not realistic to expect the involved parties to share exactly the same strategic goal. Rather, the difference in the strategic goals based on the complementary resources are what lead to successful IJV partnerships. Based on this rationale, it is not appropriate to conclude that the automotive IJV partnerships in China can/cannot create an environment that supports/obstructs innovation activities.

3.4. Conclusion to this Chapter

The literature reviewed in this chapter supports the idea that MNCs play a role in the enhancement of indigenous innovation in China. The contribution of MNCs is mainly demonstrated by their substantial resources, capabilities, and the influence on the local firms through the collaboration. Specifically in the form of IJVs, the exchange of complementary resources and the opportunity of inter-partner learning can drive the innovation activities in the IJV company and, consequently, benefit the parent companies. Considering the innovation literature discussed in the previous chapter, it seems that the innovation literature and IJV literature basically align with each other. The comparison between the conclusions of IJV literature and innovation literature is presented below in accordance to the factors.

Factor 1: Innovation Environment

An innovation-friendly internal environment is recognised in the literature to be critically important in building the innovation capacity of a firm. In this regard, the IJV theories do not seem to suggest that IJV partnerships can/cannot lead to an innovation-friendly environment. This is because the parent companies could have different strategic expectations from the IJV company. Despite this, it is clearly suggested in the literature that an IJV partnership promotes the collaborative R&D activities between the involved parties as a consequence of exchanging complementary resources (e.g. Minin and Zhang, 2010; Xu, 2011). Therefore, it is speculated that the IJV partnership can be potentially beneficial for the internal environment of innovation within an IJV.

Factor2: Resource Accessibility

One of the main reasons why an IJV is argued to be a medium to drive innovation is that the IJV company can benefit from the direct access to the collaborative resources of its parent companies. This is especially the case considering the fact that automotive MNCs are generally capable of a substantial amount of financial resources, highly advanced technology, and managerial know-how. As discussed in Chapter 2, accessing external resources increases the likelihood of innovation. In this respect, the suggestion of IJV theories seems to match the suggestion of innovation theories to a great extent.

Factor 3: Innovation Process

The current literature suggests that there is a process of innovation. However, the current literature does not seem to provide a theoretical model of the innovation process that can accurately control and predict innovation. The process of innovation can differ from firm to firm. Despite this, the multi-stage model of Pak et al. (2015) provides an insight of how this process can be in the context of IJVs. Hence, this research takes the model of Pak et al. (2015) as a framework to understand the innovation process within an IJV company. Additionally, the mutual learning effects are also recognised in the literature and hence, it is also taken into consideration in the process of innovation.

Factor 4: Stability of IJV

Other than these three factors, the review of the IJV literature also finds that IJV partnerships can often suffer from instability issues. There are a number of factors that can cause instability issues in an IJV, which consequently limits the effectiveness of co-operation and even leads to the failure of an IJV. Therefore, in looking at an IJV's innovation behaviour, the stability of the IJV must be examined first. The stability of an IJV is hence taken as an important factor (**Factor 4**) in understanding the innovation behaviour of an IJV.

As a conclusion, the innovation theories seem to basically align with the IJV theories. There do not seem to be any major conflicts between the IJV literature and innovation literature. Hence, it is considered appropriate to consider an IJV partnership to be a medium to drive innovation. The four main factors discussed above represent the main themes in understanding the innovation behaviour within IJVs. These four main themes and the specific factors to be considered are summarised in the table below.

Table 3.4: Factors Concluded from Literature Review

Factor 1: Innovation Environment	**F1.1**	Strategic Focus
	F1.2	Resource Commitment
Factor 2: Resources Accessibility	**F2**	Resource Accessibility

Factor 3: Innovation Process	**F3.1**	Market and Industry as Drivers
	F3.2	Resource Migration (In IJVs)
	F3.3	Resource Adaptation (In IJVs)
	F3.4	Mutual Learning Effects
Factor 4: Stability of IJV	**F4.1**	Suitability of Partners
	F4.2	Instability Factors

It was discussed before that the government posed strict requirement on IJVs in order to ultimately improve their technological capabilities of local firms. At this point, it seems that the government's logic of requiring IJV partnerships between local automotive firms and automotive MNCs meets with the theoretical suggestions. Consequently, the automotive IJV partnerships should lead to some innovation performance in the IJV company and, more importantly, some reverse knowledge migration effects that benefit the parent companies. In fact, this is what is actually expected by the Chinese government. The overall innovation performance of some of the major automotive IJVs in China will, therefore, be discussed in the next section in order to provide a preliminary test of this theory.

Chapter 4: Building to Research Question

4.1. The Innovation Achievements of Automotive IJVs in China

As a brief summary of the previous chapters, this study finds that innovation is significant for the further development of both firms and China's economy as a whole, and it is a similar case with the automotive industry in China. It was discussed in the previous Chapter that an IJV partnership is taken by current literature as a means to drive indigenous innovation in the automotive industry in China despite the potential instability issues of IJVs. However, despite the fact that the automotive IJVs in China have been established for a number years (5-27 years) and appear to be stable, the real-life examples would suggest that the innovation achievements in the automotive IJVs in China are rather limited. The innovation achievements of the automotive IJVs mostly represent incremental innovation results and in minor cases, architectural innovation achievements. This section presents the innovation performance evaluation of the automotive IJVs in China in general.

4.1.1. Criteria for Innovation Evaluation

It is discussed in Section 2.2 that this research defines innovation as *"successfully commercialised new technologies, designs, business models or processes."* Also, the definition of innovation reflects the consideration that there is a clear distinction between invention and innovation as suggested by Schumpeter (1934) and Freeman (1982). Hence, this research will evaluate the innovation achievements of the automotive IJVs considering the products the automotive IJVs delivered to the market as the parameter for this. Innovation can be classified as incremental innovation, architectural innovation, and radical innovation. These innovation results involved a different level of technological newness that can bring a different levels of improved competitiveness to a firm. In the context of IJVs, there can be different level of knowledge feedback effects. This perfectly serves the purpose of this research as this research focuses on how an IJV can support the enhancement of indigenous

innovation. Therefore, this research will look at innovation results in accordance to these three types of innovation.

As a summary of the evaluation of innovation performance in the automotive IJVs in China, this research finds that Chinese automotive IJVs have only achieved incremental innovation and architectural innovation outcomes which do not involve the improvement to existing technology or introduction of new technology. The next two sections will demonstrate and explain the phenomena with supporting examples.

4.1.2. Examples of Incremental Innovation Strategy

Perhaps the most common way that automotive IJVs in China innovate is localising the well-established foreign car models by making a slight change to them. One of the major ways to achieve such innovativeness is represented by the letter 'L' on the back of a number of cars. This stands for a longer wheelbase and, more importantly, more space inside. According to 'the longer, the better' principle (China Daily, 2010), the absolute majority of mid- and large-sized sedans makers are forced to build longer wheelbase versions of their models to sell specifically in China (Autonews, 2013). Other than giving extra length and space to the cars, the automotive IJVs in China also fractionally modify the bodyworks and interiors of existing models.

For instance, the new BMW 3 series (F30 model) vehicles are made differently in China. According to Lu (2012), this difference is mainly evident in the dimensions of the vehicle, including length and wheelbase. As stated by Brilliance-BMW themselves, the locally made F30 3 Series focuses on the passengers instead of the driver (Brilliance-BMW, 2010), whereas most BMW cars are generally designed for drivers rather than passengers. For locally made cars, the 100-mm extra space in the back is also accompanied by two reading lights and an electrically adjustable seat, which highlights the emphasis on the comfort of passengers in the back seats (Lu, 2012). All of the improvement made to the locally manufactured BMW 3 series is designed to suit the local customers' need for length, space and luxury, and they are ultimately marketed as 'localised innovation' by Lu (2012). On the other hand, key technology, such as the engine and the transmission, remains as developed by BMW

in Europe (Lu, 2012).

Based on the innovation classification method, this kind of innovation involves only incremental changes to the existing product to deliver more value to the product, and is, therefore, considered *incremental innovation*. Such an *incremental innovation* strategy is universally adopted by all automotive IJVs in China. Other examples of this can be easily found with affordable compact cars, such as the locally made Honda Fit hatchbacks and VW Polo; mid-class cars such Nissan Teana and Buick Avenue; and other premium car models, such as locally manufactured Mercedes C-Class and E-Class and Audi A4 and A6 models.

4.1.3. Examples of Architectural Innovation Strategy

Other than the incremental innovation results which deliver limited extra value to the customers, there is also evidence to suggest that some of the automotive IJVs in China have managed to deliver architectural innovation outputs. The Volkswagen Lavida is a perfect demonstration of Chinese-style architectural innovation. The creation of the Volkswagen Lavida is the collaborative result of the IJV between Volkswagen(VW) Germany and Shanghai Automobile Industrial Corporation (SAIC), which exactly focuses on what Chinese consumers expect from a car. The VW Lavida was entirely developed and built by a joint venture company based on the key components from the existing production lines of both VW and SAIC and is commercialised specifically in China. According to SinaAuto (2014), the VW Lavida is a collection of existing technology and production processes. Its appearance, including its exterior and interior, are specifically designed to suit the taste of the Chinese consumer only. Yet, it is an entirely new product that is highly desirable in the market of China. To keep costs down during the course of the project, components and modules of both vehicles were standardized or modules that already existed within the VW Group were used (SinaAuto, 2014).

The innovation results that can be seen in Lavida reflect architectural innovation, as the VW Lavida represents the recombination of existing technologies. The platform of VW Lavida – the VW PQ34 platform (also known as the A4 platform) is famous for being the chassis of small city cars in Europe, such as the VW Golf and VW Beetle

(SinaAuto, 2014). The last car made on the chassis of PQ34 was the Audi TT Mk1 in 2004, after which VW stopped the usage of this platform in Europe. However, the IJV company of SAIC-VW Lavida started its production on the same platform in 2008. Other than the SAIC-VW Lavida, the longest car made in Europe on the same platform is the VW Bora (also known as VW Jetta Mk4), which is more than 200mm shorter than the SAIC-VW Lavida (4376mm) (SinaAuto, 2014). The length of the VW Lavida allows it to look big and spacious and consequently allows it to attract Chinese consumers, which is argued to be one of the major reasons for its success (iFengAuto, 2012).

Despite a lack of technological innovation, the VW Lavida has delivered architectural innovation results. Such architectural innovation results represent the recombination of existing technology and the understanding of the local market. As a result of this effort, it has achieved remarkable success in the market, as it has been one of the bestsellers since its introduction (CAAM, 2014). Similar cases also include the VW Lamando saloon, Ford Ecosport, Toyota Levin, and Honda Crider. These models are all developed specifically in China by the IJV company as a result of the recombination of existing technology and components, which are classified as architectural innovation results.

As a conclusion to the innovation performance evaluation of the automotive IJVs as a whole, the evidence seems to suggest that the automotive IJVs in China have only managed to deliver incremental innovation and architectural innovation achievements based on the existing products, technology and components of MNCs. There does not seem to be any evidence to suggest innovation results that involve the introduction to new technology or the improvement to existing technology. The next section will discuss the implication of the limited innovation performance in automotive IJVs in China.

4.2. The Gap in Current Literature

The theoretical basis of this research is built on some well-established innovation

theories that provide some theoretical suggestions as to understand the innovation behaviour. Upon reviewing these innovation theories, it is concluded that there are three main factors to understand innovation. They are the innovation environment (**F1**), the resource accessibility (**F2**) as well as the process of innovation (**F3**). These three factors can influence the innovation performance of a firm. Specifically in the context of IJVs, the stability of IJV (**F4**) should also be considered in understanding an IJV's innovation behavior. This is because, though unlike **F1-F3** the stability of an IJV will not improve its innovation performance, the instability issues can cause operational problems which obstruct the innovation activities. As discussed in the previous chapter, the current literature on international collaboration and IJVs suggests that IJV partnership represents a good medium to drive innovation. Upon reviewing the mechanism that allows an IJV to drive innovation, this research found that the theoretical suggestions of both the IJV literature and the innovation literature basically align with each other (in terms of **F1-F3)**.

However, the previous section suggested that there has only been limited innovation performance in the automotive IJVs in China. The architectural innovation and incremental innovation outcomes achieved by the automotive IJVs in China, by their nature, do not seem to involve any technological development. Rather, they merely represent the result of a deep understanding of marketing behaviour. This is especially true considering the modified products/new products that the IJVs introduce to the market mostly remain the same with respect to the technologies used in them. Additionally, there does not seem to be clear signs or evidences showing it is a common phenomenon that the automotive IJVs suffer from significant instability issues, which obstructs the collaborative innovation activities. Therefore, in suggesting the capacity of IJVs to drive innovation, there seems to be a misalignment between theoretical suggestions and real-life practice, as current literature on IJVs do not seem to provide a sufficient explanation on the limited innovation performance of the IJVs.

As discussed before, the *Multi-Stage Model of Knowledge Management* of Pak et al. (2015) illustrates the mechanism of how the innovation achievement in an IJV can benefit its parent companies. According to the model, the complementary resources

are combined and modified and adapted in an IJV to generate innovation results, which can be harvested by the parent companies. Real-life examples support the arguments proposed by Pak et al. (2015). Taking SAIC as an example, the complementary resources between SAIC and its foreign IJV partners resulted in incremental and architectural innovation results. As a consequence of innovation achievements in the IJVs, SAIC is now capable of both making styling changes to its independent vehicles and designing new car models by recombining existing components. The Roewe (known as Rover in the UK, which is now a SAIC owned brand) RX5 sports utility vehicle can perhaps best demonstrate the capability of architectural innovation of SAIC. This is because the RX5 model is independently developed by SAIC. Its key components are developed elsewhere (e.g., its SSA chassis was first used in MG models; the 15E4E engine originated from Chevrolet models). It is a similar case with other automotive IJVs in China, such as the GAC Group and the FAW Group, as they are also capable of delivering new products based on existing technologies/components.

Nevertheless, the 'market for technology' strategy that led to the strict requirement on IJVs aimed to ultimately enhance the technological and innovation capacity of the Chinese firms. Based on the suggestion of the *Multi-Stage Model of Knowledge Management by* Pak et al. (2015), it seems that the automotive IJVs in China need to achieve innovation outcomes that involve the improvement of existing technology or the development of new technology in order for the parent company to benefit from them and consequently, address the issue of limited technological capability. However, the reality is that there have only been limited innovation results that do not involve any technological innovation results. As a consequence, the parent companies would not be able to benefit from new technologies and consequently, improve their technological capabilities. In this sense, the IJV-innovation strategy of Chinese government seems to have failed to provide a feasible solution to the limited technological capabilities in the automotive firms of China. In fact, it has been more than three decades since the introduction of China's IJV-innovation strategy. All of the automotive IJVs were established at least ten years ago, and some of them were established three decades ago. The reality is that the local automotive firms are still

incapable of technologies that allow them to compete in either local or international markets.

As a conclusion, it is evident that the automotive IJV partnerships have indeed led to some innovation achievements as predicted by the IJV literature. Yet, the innovation achievements have been rather limited, which means that there are only limited reverse knowledge migration effects. The current literature on IJVs revealed some features of IJVs that drive innovation, yet current literature cannot seem to fully explain the limited innovation performance of IJVs. Hence, it is speculated that there are some factors that have not been appropriately considered by the current literature in indicating IJV's capacity to drive innovation and enhance the innovation capacity of local firms. As a consequence, the effectiveness of IJVs as a medium to enhance indigenous innovation capacity in the automotive industry in China, especially with regards to technological innovation, is also questioned. Based on this rationale, this research focuses on exploring the explanations for the limited innovation performance in automotive IJVs in China. Therefore, the main research question is as follows:

Why has there been only limited innovation performance in the automotive IJVs in China, contrary to the current theories on the capacity of IJVs to drive innovation?

The review of the current literature on innovation and IJVs revealed a number of factors to understand innovation behaviour in the context of IJVs (**F1–F4**). These factors constitute four main themes. This research will examine the effectiveness of Chinese automotive IJVs in enhancing innovation in accordance with these themes and factors. The detailed research design will be presented in the next chapter.

Chapter 5: Methodology

The previous chapter established that the automotive IJV partnerships in China generated some innovation performance, as predicted by some IJV literature. Consequently, the innovation achievements have benefited their parent companies, especially the local parent company. However, the innovation achievements have been limited as the automotive IJVs have been focusing on delivering incremental and architectural innovation based on existing products and technologies. These innovation results do not concern improving existing technology or introducing new technology, which is not what the government expects. Hence, the effectiveness of IJVs as vehicles to drive innovation is questioned.

In light of this, this research aims to find an explanation for the limited innovation performance in automotive IJVs in China. To achieve the research objective, this research employed a qualitative case study research method. The research design is presented and discussed in detail in this chapter, including the philosophy behind the selection of the research method, the selection of cases as well as the strategy of data collection and analysis.

5.1. Research Philosophy

In social science research, a series of research methods exist that allow the different types of researches to be conducted. Nevertheless, all the research methods can be divided into two types, namely qualitative research methods and quantitative research methods (Cassell and Symon, 2004). The adoption of a research method depends on the nature of the research. This section will discuss the philosophy behind the research methods and justify the choice of the research method employed in this research.

5.1.1. Research Focus Areas

As discussed in the previous chapter, this research aims at exploring the underlying

factors that obstruct the innovation activities in automotive IJVs in China. Considering this, this research has two main research focus areas. First, it finds it important to understand the innovation behaviour in automotive IJVs in China as it can provide an overall picture of the patterns of innovation activities in the automotive IJVs. A number of factors have been concluded as a theoretical framework in Chapter 2 and Chapter 3 to understand innovation and specifically the innovation behaviour in the context of IJVs. This research will look at the innovation behaviour of IJVs in accordance to these factors. On the other hand, understanding the process in the innovation activities in the automotive industry in China is also considered significant as it can provide insights for local firms on how to better engage in the innovation activities, as well as an evaluation of the current Chinese government policy.

Based on these two areas, this research will reconsider the feasibility of the IJV as a vehicle to drive indigenous innovation capacity by researching the potential factors that obstruct the innovation activities within automotive IJVs in China. The result of this research is expected to fill the theoretical gap by identifying the current literature's underlying assumptions on the capacity of IJVs to drive innovation. Based on the identified factors, this research can evaluate the effectiveness of IJVs in enhancing the innovation capacity in the automotive industry in China.

5.1.2. The Qualitative Research Method

To investigate the innovation behaviour in automotive IJVs in China, this study requires collecting data from the in-depth study of a number of chosen automotive IJVs in China. The data includes individual interviews with each partner of the automotive IJVs to fully capture the picture of the innovation behaviour. Nevertheless, this study finds that the types of data needed to achieve the research objectives are mainly based on the understanding of highly complex and dynamic human/organisational behaviour. Realistically, quantifying such an understanding effectively can be extremely difficult. Moreover, there are only 33 automotive IJVs in China; hence, the sample pool is not large enough to draw a statistically meaningful conclusion regarding the patterns and trends based on the quantitative data.

Instead, to explain the limited innovation performance within the context of

automotive IJVs in China, this research can be classified by a number of studies as a bottom-up method based on the qualitative data from the real-life phenomenon (Liu, 2009; Yin, 2003; Silverman, 2011). This study is designed to focus on factors associated with the collaborative innovation process by observing different perception/views of involved partners of the automotive IJVs. It is considered appropriate to generate a new 'ought to be' grounded theory suggested by Cohen (1980), which is in turn derived from the detailed understanding of the cases studied (Cohen, 1980; Silverman, 2011). Therefore, qualitative data analysis, which provides the contextual understanding required by the research subjective through the interview respondents, was considered a more valid approach than a quantitative data analysis. This argument is supported by a number of studies as qualitative data is better used when the research focuses on the wide and deep understanding of the subjective 'why' and 'how' questions on the basis of the complicated social phenomenon (Cohen, 1980; Sukamolson, 2001; Liu, 2009). Despite the limitation of the subjective nature of qualitative data, as recognised by Bryman (2001), this study finds qualitative data to be appropriate to understanding the highly complex organisational behaviour given the nature of this research. In this research, such qualitative data mainly represents a detailed analysis of the interview data of both of the local and foreign partners involved in the selected IJVs to understand the innovation behaviour.

5.1.3. Case Study as a Qualitative Research Method

The qualitative case study research method is widely applied to research like sociology, law or management that require a detailed investigation of the phenomenon within certain contexts based on a period of observation or qualitative data collection (Kohlbacher, 2006; Zainal, 2007). The case study research method is generally seen as being able to explain the highly complex social phenomenon involving 'why' and 'how' based research because of the focus on a few carefully selected cases (Zainal, 2007). Qualitative data provides multiple levels of analysis under the context and processes that highlight the theoretical issues and test/generate new theories under empirical investigation (Yin, 2003; Cassel and Symon, 2004; Eisenhardt, 1989). Indeed, understanding innovation behaviour in

Chinese automotive IJVs is an example of research of organisational behaviour referred to by Silverman (2011); therefore, the case study research method can be applied in this type of research.

One of the advantages of the case study research method is that it can be flexible, which allows the researcher to be both deductive and inductive (Yin, 2014). This is appropriate in this research as both induction and deduction are needed to achieve the research objective. Specifically, this research first aims to find the underlying assumptions against the current theoretical suggestions as the current theories do not fully explain the real-life phenomenon, which represents the deductive approach. This can lead to the explanation for the limited innovation performance in the automotive IJVs. This study focuses on a number of chosen empirical examples as case studies to generate the explanation for this. On the other hand, this research also aims to enhance the current theories by identifying behaviour, processes and/or factors not previously seen in the current literature (the inductive approach); it could, therefore, help the automotive IJVs in China better innovate.

5.1.4. The Case Selection Strategy

The studied cases should be selected according to the nature and objective of the study (Cassel and Symon, 2004; Punch, 2005). In order to explain the limited innovation performances in automotive IJVs in China as a general phenomenon, this research finds it necessary to focus on multiple cases. In fact, both Yin (2003) and Punch (2005) suggested that the multiple case study design enables the researcher to understand more about the studied phenomenon, population and condition. Consequently, the research could result in stronger effects in terms of generalisability within the wider context if more cases were studied (Yin, 2014). In deciding the number of cases to be selected from the empirical automotive IJVs, this research considers the generalisability issue of the qualitative case study research method and therefore mainly considers the issue of literal replication (Yin, 2003) in selecting the cases.

Yin (2014) also suggests a comparative case study design, which compares the cases according to certain defined features. The similarities and differences in the

comparison can generate relatively clearer results based on several selected cases. Eisenhardt (1989) also suggests a comparative approach based on a polar-type case selection strategy. Such a strategy compares absolutely opposite cases to each other. According to Eisenhardt (1989), such 'transparently observable cases' can be easily compared in terms of their key features (e.g. the most innovative case with the least innovative case) and generate a clear and valid research result.

However, the nature of the qualitative case study research method would mean there is relatively limited generalisability (Yin, 2014). Therefore, ensuring the selected cases have characteristics that are broadly representative of Chinese automotive IJVs in China is important. In this respect, this study finds a number of commonalities across the automotive industry in China, which gives a considerable potential for literal replication among the automotive industry in China. First, this study recognises that all automotive firms are subject to the same competitive environment, which gives the exact same background to all selected cases. Additionally, this study finds that all automotive IJVs are broadly alike in their nature. For example, most of the automotive IJVs have an equally distributed shareholding (50% for local firms and 50% for foreign firms). Most of the local automotive firms with IJV partnerships are state-owned, which are substantially supported and influenced by the government; and most of the foreign parent companies are MNCs which are highly capable of advanced technologies. The commonalities and similarities in the automotive industry in China means that the research results can be broadly applicable to all Chinese automotive IJVs. On the other hand, a considerable number of differences are also present among the automotive firms, such as duration of time established and corporate business strategy. The differences can show the different strategies and actions that the IJVs take and the consequences of these differences. The differences of the selected cases enable the research to look at the important variables that could represent the key elements of variability in the context of automotive IJVs in China.

In light of the arguments above, this research employs a multiple case design in order to have a more generalisable and representative result. Moreover, the selected cases will follow the principle of both comparative cases and polar-type cases to ensure

the clarity of research results. The details of case selection will be presented in the next section.

5.2. The Selection of Cases

The previous sections in this chapter have drawn conclusions on the theoretical strategy of case selection. In light of the theoretical case selection strategy, this research chose three automotive IJVs and one independent automotive company. This section will present the selection of studied cases and the justification of the case selection.

5.2.1. Criteria of Case Selection

This research's objective is to explore the underlying reasons for the limited innovation performance of automotive IJVs in China. As discussed in the literature review chapters, the factors that influence the innovation performance of an IJV company include the environment of innovation (**F1**), the resources accessibility (**F2**), the innovation process (**F3**) as well as the stability (**F4**) of the IJV . However, the degree of cooperation between the involved parties under an IJV partnership is rather dependent on the actual daily operation of each individual IJV, which can differ from case to case. This means that it is not possible to assess the innovation environment (**F1**) and innovation process (**F3**) as well as the stability of the IJV (**F4**) without collecting the primary data needed for this research. Instead, the capability of the parent companies, which directly influence the potential resources accessibility (**F2**) of the IJVs, is what is taken by the current literature as the main reason why IJVs should drive innovation. As the resource capability of the parent companies be assessed prior to the data collection, this research therefore takes the capability of parent companies as the major consideration in selecting the IJV cases. Despite this, the collection and analysis of the data needed for this research will consider all of the factors drawn from the literature review, namely the innovation environment (**F1**), the resource accessibility (**F2**) the innovation process (**F3**) and the stability (**F4**) of the IJV, as they are what influence the innovation performance of an IJV.

Specifically, this research considers four criteria when choosing IJV cases. First, the

foreign partner of the selected IJV case should be capable of a substantial amount of highly advanced technological resources. This ensures that the foreign partner is capable of providing technological resources to joint venture companies. Second, the foreign partners of the selected IJV companies should be well established, i.e. have a history of at least 50 years and have been operating their businesses outside the host country prior to entering China. This ensures that the foreign parties have a substantial amount of managerial and operational knowledge and know-how. Third, the local partners of the IJV cases should be state-owned companies to ensure that that the local companies can provide sufficient local support, especially from the local and central government. Lastly, the joint venture companies should have a history of at least 10 years. This will ensure that the joint venture companies have sufficient time to adapt to the operational style of each party in order to absorb and utilise the collaborative resources.

To choose a polar-type case to be compared against the selected IJV cases, the polar-type case should clearly have opposite features. Therefore, the polar-type case should firstly be a highly innovative company. As the focus of this research is given to technological innovation, the polar-type case should be a company that delivers a substantial amount of innovation achievements especially in terms of technological innovation results. Second, the polar-type case should not benefit from the direct access to the resources of MNCs under an IJV partnership. This ensures that its innovation performance is not a direct consequence of an IJV partnership, Last, the polar-type case should have a similar (or less) duration of company operation to the selected IJV cases. This ensures that the innovation performance of the polar-type case is not a direct consequence of a longer period of R&D activities.

Upon reviewing the automotive IJVs in China, this research chose three automotive IJVs and one independent car maker. These cases perfectly meet the criteria discussed before. It should be highlighted that this research is performed in line with the University of Warwick's policy on research ethics. This research, including the data and research results to be presented, could have a negative effect on the actual participating companies or interviewees. Therefore, to protect the participating companies and individuals, this research will remove the actual names of the

participating companies as well as the interviewees. The names will instead be coded to clearly distinguish the companies and interviewees. Respectively, the selected participating joint venture companies will be coded as JV1, JV2 and JV3. The local company in JV1 will be coded as JV1L, while the foreign partner of JV1 will be coded as JV1F, with the same coding system also applied for JV2 and JV3. The independent automotive company as a polar-type case will be coded as ICM (independent car maker). The following sections will present the assessment of the validity of the case selection.

5.2.2. Background of Selected Firms

This section will present and discuss the background of the selected cases to demonstrate that these selected cases meet the criteria discussed before. The description of the background of each firm will be presented in general terms for ethical considerations.

IJV Case 1: JV1:

The European partner **– JV1F,** as a global automotive firm with headquarters in Europe, is one of the largest and most well-known premium car makers in the world. The company originated from a military equipment manufacturer during the Second World War. Currently, JV1F owns two premium car brands and one top luxury car brand, including the brand of itself. JV1F's technological capabilities range from premium compact cars to fully electric vehicles as well as high-end sports cars. On the other hand, the Chinese partner – **JV1L –** is a local Chinese automobile manufacturer that originated from a state-owned minibus manufacturer. Before the joint venture, the company had a limited capability of making cars. JV1L has been fully benefiting from the support of both the local and central government of China. In the early 21st century, JV1F and JV1L signed an international joint venture partnership, which officially marks the start of the local production of foreign premium cars. JV1F dominates in the operation and control of IJVs due to its superior technology and product capability as well as their commitment in the market of China, which will be discussed in Section 6.5. In the early stage, the joint venture company was only capable of the vehicle assembly of two basic JV1F models based

on the imported spare parts from Europe. As of 2015, the joint venture company is capable of manufacturing four models of JV1F cars with the capability of locally producing 80% of the necessary parts.

IJV Case 2: JV2

JV2F, as the European party of **JV2,** is an international automotive firm headquartered in Europe, having over 100 years of history. JV2F cars represent the best-selling premium cars across the world. The technology capability of JV2F ranges from fully electric cars to cutting-edge Formula 1 racers. The Chinese partner **– JV2L –** is a Chinese state-owned car manufacturer which was founded in the 1950s as a truck maker. JV2L's trucks are popular for commercial uses because of their cheap prices and relative reliability, yet its saloon cars are less popular due to the lack of advanced car-building technology. It has been attempting to expand its production capability, which includes acquiring both local Chinese car firms as well as international firms. In 2005, JV2L and JV2F signed an international joint venture deal that put the brand of JV2F, as the most popular premium car brand, into local production. Initially, only two of JV2F's car models were produced in China, and the number increased to four in the last few years. The joint venture company suffered serious sales difficulties due to internal competition during the initial years of operation as well as a lack of localisation. JV2F also considers the joint venture company as a means of entering the Chinese market. These points will be discussed in Section 5.3. In the last few years, the sales performance of the joint venture company has been gradually catching up with its major rivals because of improved localisation of the locally produced cars.

IJV Case 3: JV3

JV3F (the European party of **JV3**) is an international automobile manufacturer founded in the early 20th century. JV3F is currently one of the world's largest car makers, and it owns more than eight brands including three major luxury car brands. JV3F group's production capability ranges from affordable compact cars to top luxury cars and high-performance sports cars. Yet the brand of JV3F mainly focuses on economic cars. **JV3L,** as the Chinese partner, is a state-owned automotive firm

founded in 1940s. This was one of the first few companies that China established to develop China's own automotive industry. Initially, the company made small passenger cars based on one European model to serve the need of government officials. As of now, JV3L is one of the largest Chinese car companies in terms of firm size and total production capability. JV3L has three joint venture partners from Europe and America.

The joint venture deal between JV3L and JV3F was signed in the mid-1980s and was seen as a milestone for the Chinese automotive industry development as it was one of the first Sino-foreign automotive joint venture deals. The joint venture deal also reflected the 'market for technology' policy that was introduced by the central government of China to enhance the technological capability of local firms. After three decades, the joint venture company makes a total of over 20 models of JV3F and Brand X (brand name removed for ethical reasons) brands, which is considerably more than the models introduced by any other Chinese automotive joint ventures. All these models are highly localised, and some of these models are even designed and produced by the joint venture company to be specifically sold in China and nowhere else. Unlike the two previous IJV cases, JV3 is capable of designing cars based on JV3F's technology.

Independent Car Maker: ICM

ICM was established in the mid-90s as a battery manufacturer for mobile phones and other electric devices. It was founded because most foreign battery makers were moving away from local production due to increasing costs. ICM replaced the automated battery production line with low-cost manpower, and ICM insisted on independently producing the key machinery itself. This aggressive cost-cutting strategy gave ICM a cost advantage over its competitors and ultimately led to its success in the battery making business. The by-product of such a cost-cutting strategy was the opportunity to fully understand and master the technology production process, which is regarded as the very basis of their latter innovation processes. After a few years of development, ICM has become one of the world's leading battery makers.

In 2003, ICM officially stepped into the automotive industry by acquiring a local Chinese automotive company. The capability of the acquired company before the acquisition by ICM was very limited, producing 1990s Japanese car models. Since then, ICM has built five major manufacturing plants across China with the capability of vehicle manufacturing, modelling R&D and vehicle designing. Throughout this process of developing into an auto manufacturer, ICM has focused on building its own R&D capability, rather than continuing to rely on imitating existing products and technology as pointed out by interviewee ICM1:

> *'We ICM people must be able to decide the fate of our own. We strictly demand ourselves to fully master the core technologies. Because we believe our survival and development depend on it.'*

The core technologies mentioned above, according to the interviewee, represent the key parts of ICM's production, such as platform, engine and transmission in their automotive business. The battery making business' success influenced the later operation of the automotive business. In fact, ICM has maintained a high independence in developing its own technological capabilities rather than relying on external forces, such as the technology capability of a joint venture partner like most other Chinese automotive firms. ICM has been doing external R&D collaborations, yet the external collaboration only acted as a supplement to their overall innovation strategy. ICM, as a relative latecomer in the Chinese automotive industry, has managed not only to survive, but also to deliver a considerable number of independent innovation achievements. Its innovation performance will be presented in the following section. ICM is currently recognised as a world-class innovator due to its innovation and technological capability.

As a conclusion to the background of the selected cases, the selected IJV cases were established more than a decade ago between state-owned local automotive firms and automotive MNCs with a substantial amount of resources and managerial know-how. This perfectly meets the criteria discussed before. On the other hand, the selection of the ICM case indeed reflects the nature of the polar-case as it is not a state-owned company. More importantly, it does not benefit from an IJV partnership, and its innovation performance has been achieved independently. To further ensure

the validity of case selection, the next section will compare the innovation performance of the selected cases. The comparison can further demonstrate that the selected cases are polar-type in nature.

5.2.3. Innovation Performance of Selected Cases

As discussed in section 2.8, the combination of qualitative and quantitative measurements represents the most appropriate method to assess a firm's innovation performance. Specifically, this section will present the quantitative results first and then the qualitative results to support the findings of the quantitative methods.

Quantitative Measurement Results

The number of patents and new products introduced as well as the number of new markets entered are the widely recognised indices for innovation performance. Therefore, this research will focus on the data of these three indexes.

Table 5.1: Quantitative Measurement

Company	**JV3**	**JV1**	**JV2**	**ICM[4]**
No. of Patent Files Registered[1]	147	6	25	15928
No. of New Products[2]	14	1	0	28
No. of New Market[3]	0	1	0	2

[1]: The numbers shown are the number of patents that are registered in the Patent Search and Analysis of SIPO (PSS, a government department), available online at http://www.pss-system.gov.cn/. [2]: The numbers shown are the total new car models that are ever introduced independently by the company (joint venture companies). [3]: ICM entered the hybrid car market and fully electrical car market, while JV1 entered the hybrid car market. [4]: ICM focuses on more than one business area, and the numbers in the table only reflect the patents relevant to the automotive industry.

As the table shows, ICM's number of patent files is considerably greater than any of the three joint venture companies. Despite this, JV3 has seemingly shown better performance in making inventions than the other two joint venture companies. The numbers of patents for JV1 and JV2 are fairly limited compared to the other two companies. Additionally, JV1 only introduced one new product since the establishment of the joint venture company in 2003, whereas JV2 has achieved none

despite being established in 2005. ICM has totally developed 28 independent car models, whereas JV3 has managed half of ICM's performance. Yet, ICM's newly introduced products include hybrid vehicles and fully electrical vehicles, whereas the new products introduced by JV3 only covers conventional engine cars. It should be also highlighted that the only new product developed by JV1 is a hybrid vehicle, yet it is reported to be predominantly based only on the effort of the foreign partner (JV1F), which will be presented and discussed later in JV1's data analysis section.

Therefore, as a conclusion, the quantitative data seems to suggest that ICM's innovation performance is far superior than the three IJV companies. Nevertheless, this research recognises that not all the innovation results are actually registered in the PSS (patent department of the Chinese government). The number of patents can indicate the innovativeness of a company, yet it does not truly reflect all the innovation performance a firm. Therefore, this research also considers the qualitative measures of innovation performance as it can supplement and verify the conclusions drawn from the quantitative measures. This will be presented in the following section.

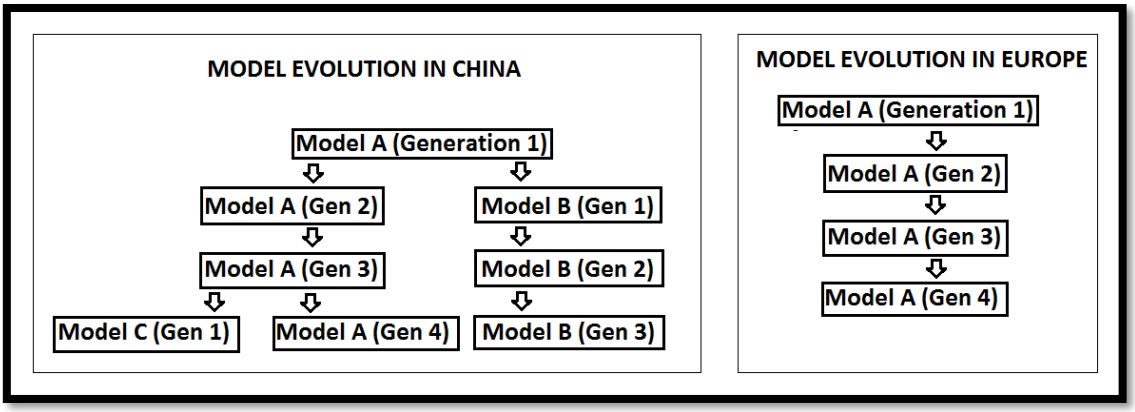
Qualitative Measurement Results

First, in looking at ICM's automotive technological development, most of the existing research tends to use words such as 'leapfrogging' or 'leaping forward' to describe the rapid technological development and innovation capacity of ICM, especially the hybrid vehicle development. ICM is currently recognised as a world-class innovator due to its innovation and technological capability, especially in new energy vehicles (NEVs). In fact, it was recognised as one of the top 10 most innovative firms in 2010. Its innovativeness is also commented on by an independent industrial expert, who was interviewed for this research and coded interviewee IIE2 (Table 5.2):

> *'ICM's innovation ability is widely recognised by the people in the industry. For example, China's first wet multi-plate dual clutch transmission, the highly efficient hybrid power trim system. Company X (A highly technological capable European automotive company, company name hidden for ethical reasons) came to form a R&D collaboration with ICM.'*

ICM's innovation results include the development of new technology and products. This can explain the large number of patents. In contrast, the innovation performance of JV3 can be seen as both *incremental innovation* and *architectural innovations*. Other than the incremental changes made to JV3F's existing model, JV3 has totally introduced 14 new car models based on existing technology and components of JV3F. It seems that JV3 mainly considers the development of new products as the achievements of the R&D and innovation activities. In fact, the evolution of the JV3F models in China greatly differs from that in Europe as Figure 5.1 below demonstrates.

Figure 5.1: Comparison of Evolution Trees



Notes: Model names hidden for ethical reasons.

JV3 develops new products that evolve from the previous generation of car models. The important contributors of such a special evolution tree can include the understandings of local customer's needs and the technology of JV3F. The development of new products based on the re-combination of existing technology is classified as *architectural innovation,* which delivers more value than incremental changes to existing products. Lastly, there only seem to be *incremental innovation* results that are achieved by both JV1 and JV2. For example, the locally produced JV1F Model X (model name hidden for ethical reasons) is made with a longer wheel base as having additional space in the back seats is one of the major considerations of Chinese consumers. These locally produced models are also made with different interior and exterior designs to suit the local consumers' tastes. Other than the incremental changes, there is no other evidence to suggest innovation results that involve technological development, especially at a radical level.

To conclude, both qualitative and quantitative measurement results show that ICM has indeed delivered far superior innovation performance, especially in terms of technological innovation. Though JV3 has achieved better innovation performance due to the delivery of architectural innovation results, the innovation performance of three IJV cases, compared to the ICM case, are limited. This is especially true considering the innovation results of these three IJV case does not concern the improvement of existing technology or introduction to new technology. Therefore, from the perspective of innovation performance, the IJV cases and the case of ICM are polar-type in nature.

5.2.4. Discussion of Case Selection

The selected IJV cases, as summarised in the company backgrounds, represent the partnership between automotive MNCs, which are highly capable of advanced technology, and local firms with local knowledge and local support. All the three IJV cases seemingly meet the criteria concluded before. In fact, these three IJV cases represent the common phenomenon in the automotive IJVs in China. This is because, firstly, most of the automotive MNCs are highly capable of advanced technology, as well as managerial and operational know-how. Second, the absolute majority of automotive firms in China are state-owned. Current literature argues that such IJVs allow the parent companies to combine the complementary resources and innovate collaboratively within the IJV. Nevertheless, the innovation performance of the selected IJVs were limited. As indicated in the previous section, JV1 and JV2 have achieved only incremental innovation performance, whereas JV3 has delivered slightly better innovation performance through developing new products. These types of innovation achievements also reflect the general achievements of automotive IJVs in China.

On the other hand, the selected IJV cases also have some differences. First, JV3 was established long before the other two despite all three IJVs being established 10 years ago. This means JV3 has had some more time than JV1 and JV2 to adapt and utilise the resources of the parent companies. Additionally, JV1F and JV2F target the

premium car market, while JV3F mainly targets the economic car market. This means the IJV companies are exposed to different technological resources, such as engine, transmission and platform. The differences make the three selected IJV cases valid subjects for study as the differences can potentially explain the varied innovation performance of the IJV cases.

In sharp contrast with the IJV cases, ICM has achieved superior innovation performance unlike the selected IJVs. It should be highlighted that ICM does not have an IJV partnership with MNCs. This means, unlike the selected IJVs, it does not have the potential benefit of accessing the advanced technology through an IJV partnership. For these two reasons, ICM is indeed polar-type in nature as its superior innovation achievements are not the direct consequence of an IJV partnership. Considering the limited capabilities of the automotive company that ICM acquired to start its own automotive business, ICM does seem to have taken responsibility for developing its own innovation capability. In fact, it is understandable that a firm without an MNC to rely on should be motivated to innovate and gain the competitiveness needed for survival. The evidences from ICM's background has clearly shown that ICM has indeed been strategically focusing on delivering innovation to build its competitiveness. This factor aligns with the theoretical suggestion (**F1.1**) and can therefore explain the superior innovation performance of ICM to some extent. Current literature suggests that there are some other factors of innovation activities including the innovation environment, resource accessibility and innovation process (Summarised as **F1**, **F2 F3**) as well as the stability of IJV (**F4**) specifically in the context of IJV. Hence, it is speculated that the case of ICM can have ways of building its innovation-friendly internal environment (**F1**), its ways of acquiring external resources via external collaboration (**F2**) and/or an efficient innovation process (**F3**), which ultimately leads to its superior innovation performance.

This research will explore and understand the innovation behaviour of the selected cases in accordance with **F1–F3**. Based on the three distinctive areas of focus, the comparison between the ICM case and IJV cases can lead to the explanation of the present gap of innovation performance between ICM and the IJVs. Consequently, the

results of comparison will reveal the factors that obstruct the innovation activities in the automotive IJVs in China. In addition to this, as ICM is a highly innovative company, the operational experience of ICM can also reveal some new insights that were not considered by the current literature on innovation.

Therefore, to conclude, the selection of cases is valid for the research focus because the IJV cases and the case of ICM perfectly meet the criteria, and they are polar-type in nature. The comparison of the selected cases is consequently expected to generate results that explain the limited innovation performance within the automotive IJVs in China.

5.3. Data Collection Strategy

A wide range of sources are available for the qualitative data collection including documented archival records, interviews, observations and physical artifacts (Yin, 2014). Nevertheless, the data collection strategy should once again echo the nature of this study. As previously stated, the data needed to achieve the research objective is considered to be mostly primary data generated by the studied cases. Therefore, this study uses the interview as the main data collection method. This section will present the justification for the data collection strategy and logic behind the interview question design.

5.3.1. Interview as a Source of Qualitative Data

Interviews allow the researchers to have a direct focus on the research objective/question in studying the selected cases and gain an insightful and detailed response from the respondents (Yin, 2014). Unlike other qualitative data, such as documentation or observation, interview data allows the researcher to access the interview participants' understanding on the specific focused areas, which can avoid potential misunderstandings of the researchers (Punch, 2005). Using qualitative interviews has some advantages. According to Yin (2014), face-to-face interviews can allow the researcher the flexibility of rephrasing or simplifying the interview questions to ensure that the interviewee fully understands the focused theme. As a consequence, the answers to some specific focus of research are more precise than other forms of primary qualitative data sources, such as surveys. Moreover,

conducting interviews can generate a higher return rate than surveys (Punch, 2005).

However, this study also recognises the subjectivity of the interview method. Punch (2005) indicates that the interviewee's perception can be subjective and selective, and hence lead to bias over the objective truth. Additionally, because this research focuses on IJVs, the local party and foreign party can possibly have different views on the interview questions. To avoid this, having multiple interviewees from each side of the IJV is necessary in order to avoid the potential bias. Specifically, this research chose three interviewees from each side of the IJVs (three interviewees from local partners plus three interviewees from foreign partners). Moreover, it is recognised that the validity and reliability of the qualitative data collected will directly influence the accuracy of the research results (Yin, 2014). Therefore, this research identifies the targeted interviewees who are capable of knowledge of the operation of the joint venture company to ensure the interview data's credibility and reliability. Table 5.2 summarises the roles and position of the interview participants.

Though the roles of the interviewees are described in generic terms for ethical reasons, this research finds that the interview participants are in a position to have sufficient knowledge of the company's operations to give credible answers to the interview questions. Additionally, the number of interviewees also reflects the consideration of the theoretical saturation. Overall, the data analysis results of this research suggest that the theoretical saturation has been achieved as the interviewees from the same company gave similar answers to the interview questions despite minor differences in presentation. The theoretical saturation is shown to a large extent in the data analysis chapter (Chapter 6). Yet, it must also be highlighted that not all the qualitative data is presented in this thesis because of the University of Warwick's regulations (PhD thesis of social science research must not exceed 70000 words).

Table 5.2: Description of Interview Participants' Role

Studied Cases	Description of Participants' Role[1]	Code Name
Case 1	A group interview of three engineers, including one chief engineer.	**ICM1**[2]

Independent Carmaker		A senior manager who is in charge of R&D	**ICM2**
		A senior manager who is in charge of marketing	**ICM3**
Case 2 Automotive JV1	**Foreign Party**	The firm's Asia HQ director in charge of marketing	**JV1F1**
		The firm's Asia HQ marketing team manager	**JV1F2**
		The firm's Asia HQ director in charge of policy making	**JV1F3**
	Local Party	A joint venture company plant manager	**JV1L1**
		A joint venture company plant manager	**JV1L2**
		A senior engineer of the firm	**JV1L3**
Case 3 Automotive JV2	**Foreign Party**	The firm's China HQ director who is in charge of policy making	**JV2F1**
		The firm's marketing team leader of China HQ	**JV2F2**
		The firm's China HQ director of finance	**JV2F3**
	Local Party	A director of the firm who is in charge of policy making	**JV2L1**
		A senior engineer of the firm	**JV2L2**
		A marketing team manager of the firm	**JV2L3**
Case 4 Automotive JV3	**Foreign Party**	The firm's China HQ director who is in charge of policy making	**JV3F1**
		The firm's manager in China HQ who is in charge of marketing	**JV3F2**
		The firm's manager in China HQ who is in charge of PR	**JV3F3**
	Local Party	The firm's senior manager who is in charge of policy making	**JV3L1**
		The firm's senior manager who is in charge of policy making	**JV3L2**
		A senior engineer of the firm	**JV3L3**
Independent Industrial Experts		The top leader in an automotive industry organisation	**IIE1**
		An officer in a policy-making government department	**IIE2**
		An editor in a well-known automotive industrial media	**IIE3**

Notes: [1] The description of the roles of the interviewees are kept in generic terms in order to ensure anonymity; [2]: The interview participants are coded according to the company they work for. For example, JV1L1 means the first interviewee who works for the local side of the joint venture case 1.

In addition to the interview participants from the selected cases, this research also considers the opinion of the independent industrial experts. This is because the independent experts can provide an objective overview of the industry, which can provide some more insights. The opinions of the experts can also evaluate the objectiveness of the interviewees from the joint venture companies.

5.3.2. Interview Questions Design

This research developed four separate interview questionnaires: one interview question set for the local party of IJV; one for the foreign party of IJV; one for the case

of ICM; and one for the independent industrial experts. It should be firstly highlighted that there are different questions for the local and foreign party of an IJV. This is because they view the operation of an IJV from different perspectives, and hence some of the interview questions must be designed differently. Despite this, the design of interview questions for IJVs is largely based on the factors that were concluded from the review of current literature. Respectively, they are **F1** (innovation environment), **F2** (resource accessibility), **F3** (innovation process) and **F4** (stability of IJV). To understand the innovation behaviour of the selected IJVs, the interview questions are designed in accordance with the themes of the concluded factors. The table below summarises the logic behind the interview design.

Table 5.3: The Logic Behind the IJV Interview Question Design

Factors (Themes)	Application on Interview Question Design
Factor 1: Environment of innovation **(F1.1-F1.2)**	The business innovation strategy of the selected cases. Whether the senior management actually focuses on innovation (**F1.1**); whether the senior management commit resources on innovation activities (**F1.2**) are assessed through the interview questions. IJV interview question Part 4 covers this theme.
Factor 2: Resource Accessibility	IJVs are argued to be able to access resources from parent companies. Therefore, the actual amount of resources that is accessible to the selected IJVs needs to be assessed through interview questions. IJV interview question Part 2 covers this theme.
Factor 3: Innovation Process **(F3.1-F3.4)**	The actual process of innovation can influence the innovation performance of a firm. Hence it is necessary to have a set of questions that explore the framework of the innovation process on the basis of **F3.1-F3.4** concluded in literature review. This theme is covered by questions in Part 3.
Factor 4: IJV Stability **(F4.1-F4.2)**	There are a number of factors that can result in instability issues which obstructs the cooperation of IJVs, which ultimately limits the potential innovation performance of the selected IJVs. Therefore, a set of questions to examine the stability of the selected IJV is needed. This theme is covered by questions in interview question part 5.

As indicated in the table above, **F1–F4** mapped out the main themes of the interview questions. **F1–F3** are what are believed by the current literature as important factors that influence innovation activities. **F4** on the other hand is also important in examining the stability of IJVs. Other than these four parts, there is also a set of interview questions (Part 1) at the beginning of the questionnaire, which explores the role of IJVs in the overall business strategy of both involved parent companies.

This part is designed to uncover the potential background information about the IJVs that is not available from the public domain. Moreover, this research designed a series of questions (Part 6) that explore the extent to which interviewees agree/disagree on the capacity of IJV partnership to drive innovation.

To avoid any misunderstandings, the interview questions sets of each theme are divided into categories of a number of sub-questions. For example, rather than asking how much resources does the IJV benefit from the parent companies, the interview questions ask what the important resources for the operation of IJV are, what each party is actually contributing to the IJV, to what extent is the resource complementarity important and to what extent has it been achieved. This is to gain as many insights as possible and avoid repeating questions.

On the other hand, the interview questions designed for ICM mainly consider how they build its innovation capacity without relying on an IJV partnership. The interview question sets for ICM are also designed based on the factors concluded in the literature review (**F1–F3, F4** irrelevant for ICM hence not considered). Respectively, the resources that are actually accessible to ICM (covered in ICM's interview question Part 2), the actual innovation process of ICM (covered in ICM's interview question Part 3) and the innovation environment of ICM (covered in ICM's interview question Part 1). Differing from the interview questions of IJVs, the ICM question sets are more exploring then examining. The question sets for ICM ask more 'what' and 'how' based questions than 'yes or no' based questions. This is because ICM has achieved superior innovation performance, and therefore its experience on innovation activities might reveal some factors that were not considered by current literature.

On the other hand, the interview questions for the industrial experts are more general than specific. The interview questions mainly cover three major areas. First, how motivated are the local automotive firms as well as their IJV companies to innovate; Second, the interview questions discover the extent to which the experts agree or disagree with the idea that IJV partnerships in the automotive industry in China support the enhancement of indigenous innovation capacity; Last, what is the progress of innovation and what is actually needed to fully develop the innovation capacity in the automotive industry in China. The main reason for interviewing

industrial experts is that they can provide objective opinions from a macro perspective. The interview data of industrial experts can be compared against IJVs and ICM to examine the accuracy of the interview data. Moreover, the interview questions were expected to reveal some more insights beyond the concluded factors.

The above represents the principle of designing the interview data. Blank copies of the detailed interview questions used in the interviews with the different types of participants (IJV, ICM and IIE) can be found in Appendix 2–5.

5.3.3. Limitations of the Data Collection

Punch (2005) suggested that there can be other sources of information as to implement the primary data and achieve the data triangulation. Other types of data could be collected from observing the studied cases to cover the innovation activities and processes of the studied cases. However, there is limited accessibility to the actual companies to conduct a field observation of the companies' daily operations. Therefore, this type of primary data is not included in this research though considered to be highly useful.

Furthermore, the supporting data to comprehensively understand the studied area can also be collected from a variety of secondary sources including journal articles, the company annual reports, newspapers, books and online websites, as well as the accessible academic databases, which are considered as helpful resources. However, referencing these types of secondary sources will make the participating companies identifiable. Therefore, this research did not include any secondary data to support the primary data for ethical consideration. However, such secondary data, including journal articles and company reports, are used by this research to better understand the background information of the companies and examine the accuracy of the interview question responses.

5.4. Data Analysis Strategy

The previous section established that the primary data needed for this research will be collected through conducting interviews. The analysis strategy of the collected

qualitative interview data will be presented in this section.

5.4.1. The Thematic Analysis Approach

In analysing the qualitative data, one widely used approach is the thematic analysis approach (Braun and Clarke, 2006). Thematic analysis is used to understand highly complex social phenomena including human and organisational behaviour (Cohen, 2011; Braun and Clarke, 2006; Thomas and Harden, 2007). Braun and Clarke (2006) argue that the thematic analysis can provide valuable insights on the researched areas, and they comment that thematic analysis helps:

> *'identifying, analysing and reporting patterns within data. It minimally organises and describes your data set in rich detail. However, frequently it goes further than this, and interprets various aspects of the research topic.'*

Zagreb (2012) argues that qualitative data requires interpretation and explanation to understand the patterns of the qualitative data. Thematic analysis allows the researcher to flexibly analyse the data either according to the established theories or develop a new theory based on the patterns of collected data (Zagreb, 2012). Thematic analysis allows the researchers to use both deductive and inductive approaches (Braun and Clarke, 2006; Zagreb, 2012).

While conducting a thematic analysis, the collected qualitative data is coded to form several themes, which are then defined and mapped out to understand the focus of the research area (Braun and Clarke, 2006). A six-phase process of thematic analysis is concluded by Braun and Clarke (2006) which provides detailed steps for conducting a thematic analysis. This includes familiarising oneself with the data and gathering codes, searching for themes, reviewing themes, defining and naming themes and lastly, producing the report (Braun and Clarke, 2006). The result of such an analysis process can lead to a well-developed report that makes sense of the data and explains the researched phenomenon (Braun and Clarke, 2006).

To summarise, the thematic analysis technique allows this research to make sense of the collected qualitative interview data and produce a report to examine and understand the innovation behaviour of the selected cases. For this reason, employing the thematic analysis approach in analysing the collected data is

considered appropriate.

5.4.2. Data Analysis Structure

Specifically, this research will analyse the qualitative data of ICM first. As discussed before, ICM's case represents a good example of a successful innovator that has been innovating without relying on any IJV partnerships. As discussed before, this is also the main reason the ICM case is taken as the polar-type case to the selected IJVs. Its experience is hence expected to show how it builds up its superior innovation performance, which can be taken as a frame of reference to explain the limited innovation performance of automotive IJVs in China.

It is discussed previously that ICM's interview questions are more open in order to explore the details of ICM's innovation strategy. It is also anticipated that the case of ICM, as a successful innovator, can reveal some factors that are not considered by the current literature. Therefore, all the raw qualitative data of ICM will be analysed using the thematic analysis approach. In detail, the raw qualitative data collected from ICM's interview is coded according to the underlying meaning of the qualitative data. The codes will then be categorised to generate a series of themes. Following this, this research will explore and map out the pattern of these themes to understand how ICM builds its innovation capacity.

Other than ICM's experience, the current literature has also drawn some important implications on how a firm can effectively build up its innovation capacity. These themes are concluded as innovation environment (**F1**), resource accessibility (**F2**) and innovation process (**F3**). These three main themes and the factors of each theme will then be compared against the results of the ICM case. It is anticipated that there should be substantial similarities between the theoretical suggestion and the case of ICM because ICM has been a successful innovator. The similar factors/themes that are suggested by both ICM and current theory would mean that these factors/themes indeed effectively enhance innovation capacity in the context of the automotive industry in China. Hence, these similar themes/factors will be applied in the analysis of IJV cases. On the other hand, it is also anticipated that the comparison could reveal some differences between the ICM case and the existing theory. In this

case, this research will consider the condition of the automotive industry in China and critically discuss the differences to conclude the most feasible suggestion.

The results of the comparison between the existing theory and the case of ICM is expected to suggest a number of new or implemented themes and factors that effectively constitute innovation. The data analysis of the three IJV cases will be performed in accordance to these themes and factors. Relevant quotes from the qualitative data will be selected to examine whether each of the three IJVs has managed/failed to achieve the themes/factors in order to explain their innovation performance. However, it is anticipated that the interviewees of each case can have different opinions on each factor/theme. In this case, these quotes/comments will be examined through the quotes/comments of the independent industrial expert (IIE) or other interviewees in the same IJV case. The secondary data from accessible public sources can also be used to examine the contradicting quotes/comments.

After analysing each individual case, a cross-case analysis will be performed to compare the similarities and differences of the three IJVs. As discussed previously, the automotive IJVs in China are largely similar in nature. For example, all IJVs have equally distributed holding structures; all of the automotive MNCs are technologically capable, whereas the local firms are not; all of the IJVs rely on the technology of the MNCs. Therefore, the similarities are then taken as common phenomena of the innovation behaviour of automotive IJVs in China. These common phenomena will be further compared against the suggestion of the ICM case in order to draw the research findings. As discussed before, the innovation of JV3 is better than JV1 and JV2. Hence, it is anticipated that there should be different actions/strategies applied in JV3. Therefore, the differences in the IJVs are expected to reveal the explanations for the varied innovation performances of the selected IJV cases. Figure 5.1 below shows the overview of the data analysis structure.

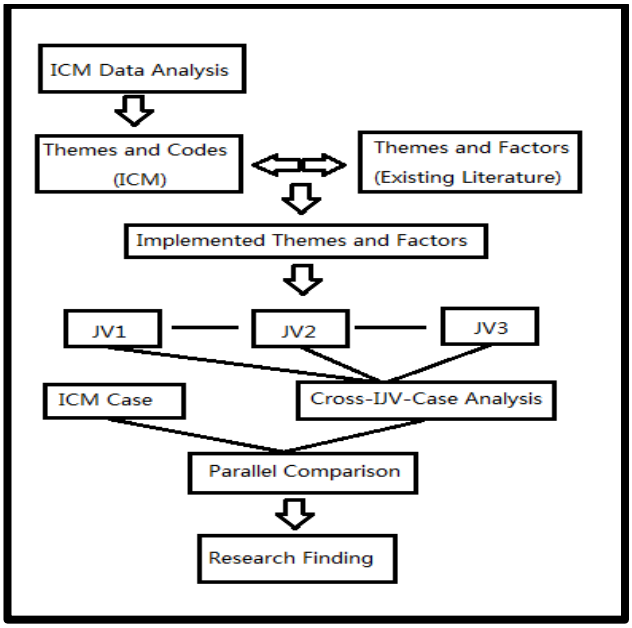


Figure 5.2: Overview of Data Analysis Structure

Chapter 6: Data Analysis

The qualitative data needed for this research has been successfully collected from the conducted interviews of targeted interviewees. This section will present the data analysis of each case. The structure of data analysis is discussed in the previous chapter (Section 5.4.2). The data analysis of the four selected cases will be presented separately in different sub-sections. At the end of this chapter, a discussion of the common phenomena in the Chinese automotive IJVs will be presented.

I. The Case of ICM

As concluded in Section 5.2.4, ICM has achieved a far superior innovation performance than the selected IJV cases. It is known that ICM does not have an ordinary automotive joint venture with an automotive MNC. The purpose of this section of data analysis is to explore the reason for ICM's innovation capacity and conclude on what is good practice based on the findings of the ICM case.

6.1. ICM's Data Analysis Part 1: ICM's Innovation Environment

The literature suggests that the internal environment of innovation has an impact on a firm's innovation activity and its results. Therefore, the first part of the data analysis focuses on the evaluation of ICM's internal environment of innovation.

6.1.1. Thematic Analysis: Innovation Environment

The literature brought forward the concept of the culture of innovation, which represents an innovation-friendly internal organisational environment, as opposed to the counterculture of innovation, which comprises a number of factors that hinder innovation activities. ICM, as a world-class innovator, recognises the effects of the culture of innovation, as one of the interviewees (ICM2) stated:

> *The statement 'technology brings the future' is our business philosophy. With the unremitting effort of top to bottom, we have successfully established our*

own culture of innovation and we have proved that we benefit from doing it (ICM2).

The establishment of a corporate culture of innovation represents the means to ensure that ICM's environment can allow innovation to thrive internally. The interviewee sees senior management as major contributors to the successful establishment of ICM's innovation culture. Therefore, the interaction between both top management and the employees holds the key to the building of ICM's internal innovation environment. The raw data that represents the attitude of ICM's top leaders and their actions in ensuring the success of their strategy execution are presented in the table below.

Table 6.1: Coding of Raw Qualitative Data - ICM's Innovation Environment

Code Examples	Code Description	Codes
'They (ICM's senior leaders) are fanatical about new technology' 'Technology is the king, innovation is the basis' 'We look out for every new technology in the industry'	Comments to show that ICM's top leaders are sensitive to innovation	**Sensitivity of Leader**
'Our competitiveness originates in our innovation' 'We can achieve dominance in the industry with our innovation capability' 'Our survival and development depends on it' (innovation)	Comments to show that ICM takes innovation as the origin of their firm's competitiveness	**Source of Competitiveness**
'We purchase existing models from each model year to learn their technology' 'Our company regularly recruit talents which can bring us new technology' 'Their company (ICM) supplies the employees with new technology to learn'	Evidence of ICM's R&D expenditure made to support their innovation activities.	**R&D Investment**
'Our company provides life-long training for our employees' 'Employees with different experiences are trained accordingly'	Evidence of ICM's staff training expenditure made to support their innovation activities.	**Training Investment**

Factors identified in Table 6.1 above, ***Source of Competitiveness*** and ***Sensitivity of the Leaders***, taken together seems to suggest that the ICM's leadership strategically focuses on innovation. The significance of strategic focus (**F1.1**) on innovation is also recognised by the innovation literature, such as the concept of Strategic Intent and Culture of Innovation. The strategic focus on innovation influences the strategy-making of a company. There is also evidence that ICM commits its organisational resources on the innovation activities (**F1.2**), which can be seen from **R&D investment** and **Training Investment**. All of the codes together seems to suggest that ICM's environment is built upon the strategic focus on innovation and the commitment of resources as a way to implement the corporate strategy. This is in line with current innovation literature as summarised in Table 6.2 below.

Table 6.2: Summarised Themes – ICM's Innovation Environment

Codes	Theme Description	Themes
Sensitivity of Leader	Reference made to suggests that the top leaders of ICM recognise the significance of innovation and take innovation as the fundamental strategy.	**Strategic Focus**
Source of Competitiveness		
R&D Investment	Reference made to suggest that ICM commits resources to implement its corporate strategy towards innovation and ensure the employees have sufficient resources to take part in innovation activities.	**Resource Commitment**
Training Investment		

In the operation of ICM's business, these two themes seem to influence and interact with each other. For example, ICM1 commented that the competitiveness brought by the innovation activities can further enhance the strategic focus on innovation. As a consequence, the senior management is more willing to commit resources in the innovation activities in order to sustain the competitiveness. Having reviewed ICM's data in the internal innovation environment, the key themes and codes emerged from the analysis are mapped, as shown in Figure 6.1:

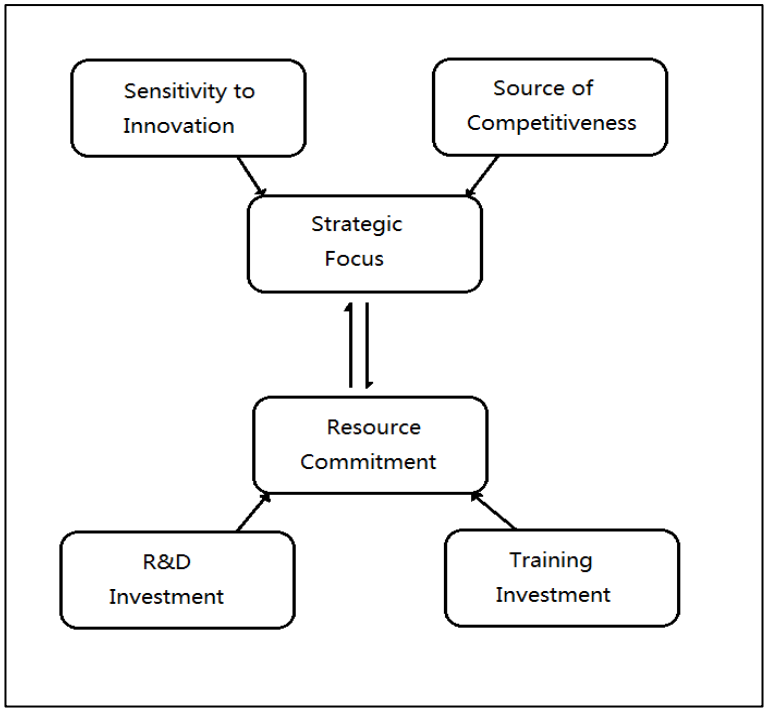


Figure 6.1: Initial Theme Map – ICM's Internal Innovation Environment

According to the literature, the ultimate goal of having an innovation environment is to increase the likelihood for innovation to thrive internally, as discussed in the literature review. In the ICM case, it has benefited itself in being innovative and, therefore, the senior ICM leaders carry on the technology and innovation-driven business strategy in operating the firm. In implementing the business strategy, the approach of the senior ICM leaders is to grant the employees enough resources for learning and innovating in parallel with instilling in their employees an attitude towards innovation.

6.1.2. Discussion of ICM's Innovation Environment

The evidence seems to suggest that ICM's approach towards building up an innovation-friendly internal environment is mostly in line with the theoretical suggestion discussed before. Yet the ICM case study reveals that its approach further reflects the theoretical suggestion.

Firstly, ICM uses training as one way to further enhance the organisational environment of innovation. For example, according to interviewee ICM2, ICM requires every employee to have a reasonable understanding of existing technology regardless of the nature of their jobs and, therefore, even the training of the

employees who are less involved in the technology development, such as human resources departments, will cover technology content. According to interviewee ICM3, in this way, ICM's employees can influence each other and eventually create an atmosphere in which all of their employees become greatly interested in technology.

Secondly, ICM's case suggests that the top leadership's strategic focus on innovation can be better established on the basis of successful business experience. As discussed above, ICM's automotive company started as a latecomer, and the acquisition of an automotive firm in northern China only gave ICM a limited technological insight into the automobile manufacturing business. However, ICM's successful business experience as a battery maker led its automotive business towards an innovation-driven strategy. Consequently, the senior leaders can be motivated to innovate as they believe it is the basis of their competitive advantage, and they will establish a strategic focus to ensure such competitiveness.

ICM's approach to establishing an organisational innovation environment is similar to the theoretical suggestions (**F1**). Despite this, the case of ICM revealed some detailed actions that were extracted from the qualitative data analysis. As discussed in the literature review, the strategic focus on innovation and commitment of resources are what is suggested in the literature to be important factors in building up a good innovation environment. Therefore, the case of ICM further confirmed the strategic focus (**F1.1**) and the resource commitment (**F1.2**) are the important factors for building up a good innovation environment.

6.2. ICM's Data Analysis Part 2: ICM's Innovation Model

As discussed before, ICM is widely recognised as a world-class innovator. The business innovation model of ICM can have great value in understanding the innovation behaviour in the automotive industry in China. This section is going to look at ICM's business innovation model, which will be later compared against the theoretical suggestions in order to conclude the implemented factors and themes as to understand the innovation behaviour.

6.2.1. Thematic Analysis: The Initial Framework

Other than the innovation environment (**F1**) discussed in the previous section, current literature also suggest that the resources accessibility (**F2**) and innovation process (**F3**) also have impacts on the innovation performance of a firm. One of the interviewees commented on the resource accessibility and innovation process:

> *The amount of resources that is available to the firm is certainly related to the innovation capacity of a firm. This is because innovation needs to have some basis. We do not repel external resources but I believe it is also about how much resources a firm can really consume and digest (ICM2).*

This quote reflects the recognition of the significance of resources in the process of innovation. Yet innovation itself is more than a direct consequence of accessing resources. As the quote indicates, ICM utilise external resources to enhance their technological capability. However, the interviewee refers to the innovation process as 'consume and digest', which signifies the importance of the actual process of innovation. The conclusion drawn from the literature review supports this idea, yet the current progress of innovation research cannot fully encapsulate the process.

The interview question Q3.2 was designed to provide some basic understanding of ICM's innovation process as a series of steps. In examining the objectiveness of their answers, this research also takes the opinion of an independent industrial expert (IIE) into consideration. The answers given by the interviewees are summarised in Table 6.3. As shown in the table, the interviewees present an overall picture of the innovation process of ICM. The answers with a similar meaning are presented in the same row. It seems the group interview (ICM1) gave the greatest details while the answers from other interviewees, largely agree with the group interview.

Table 6.3: Summary of Innovation Process Suggested by Interviewees

No.	ICM1	ICM2	ICM3	IIE1	IIE2
1	Observe the market				Observe the market
2	Observe existing products				Observe Industry
3	Copy existing product	Acquire sample	Imitate existing products	Starts from imitation	Purchase existing product
4	Learn from their (other car makers') models		Learn from imitating		
5	Research the technology within their (other car makers') products	Disassemble and research	Reverse engineering	Research unknown tech	Research the tech from existing product
6	Integrate with own tech	Integrate with own technology	Integrate with own tech		
7	Create new technology and product	Produce own product	Produce own product	Apply own product	Produce own products

The first two rows are understood by the researcher as the pre-action stage. This mainly concerns the observation over the market, the industry and existing products. According to interviewee ICM1, these can give an approximate direction of the development. It is suggested in some innovation process models that both market need and industrial development (**F3.1**) can drive the innovation activities of a firm. The experience of ICM seems to support this theoretical suggestion and translate it into an action. The researcher, therefore, summarises this stage as the ***Observation Stage***. Then, the third row is concluded as the actual starting point of the actual innovation activity because it is the actually first stage of the resource flow, that is, acquiring resources. As discussed before, resources input is the basis of innovation activities. Current literature also suggest that having external resources via external collaboration can lead to the improved innovation performance. Therefore, the researcher understands this stage as ***Acquire Resources***, meaning acquiring resources for the purpose of innovation.

After the acquisition of resources, Row 4 seems to represents the process through

which ICM perceive the acquired knowledge/technology as it is understandable that understanding the acquired resources should come before innovating. Row 5, on the other hand, gives an extremely similar insight into the process of perceiving new knowledge or technology. The researcher combines rows 4 and 5 and considers them as ***Understanding Stage*** because understanding is the ultimate result of learning and researching. This stage also offers an explanation for what is referred to by the interviewee as 'consume' resources. In Row 6, the term 'technology integration' was talked about by almost every interviewee and is stressed as the key part of their innovation model. This process is understood as moving from the understanding stage to the ***Mastering Stage,*** meaning that inflow knowledge can or will be used in the business operation. After mastering the acquired knowledge, ICM is then able to apply the newly acquired knowledge to their design and, ultimately, to production, which is confirmed in Row 7, in that the application can include the creation of new product and technology. Therefore, this stage is summarised as the ***Applying Stage.*** Additionally, ICM's innovation process represents the a process between acquiring resources and generating innovation results. Therefore, this study classifies understanding and mastering stage as the ***Resource Utilisation Process,*** which represents the process of ICM that turns the input of resources into innovation results. The initial innovation model of ICM is presented in the figure below

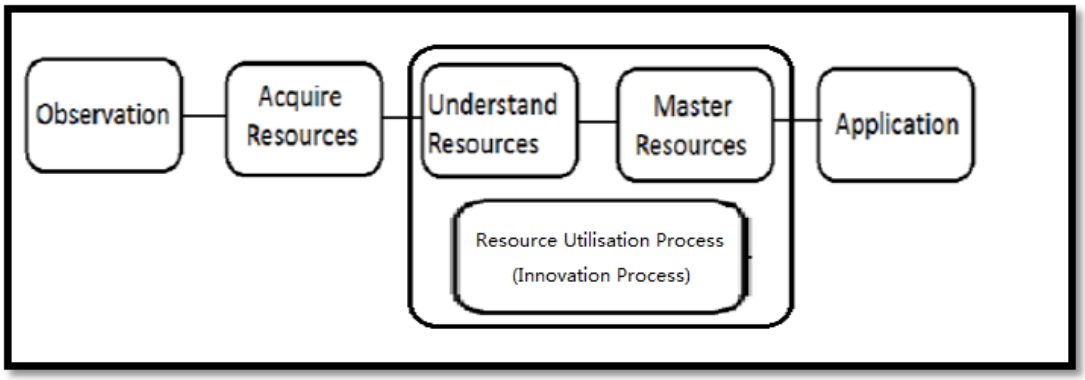


Figure 6.2: ICM's Initial Innovation Model

As can be seen from Figure 6.3, the initial summary of the innovation process suggested by the interviewees revealed a sequential process of innovation. The

detailed discussion of the similarity and differences between ICM's model and the theoretical model will be provided in Section 6.2.3.

6.2.2. Additional Information on ICM's Innovation Model

As a conclusion to the above, there are five stages to ICM's innovation models, and each of them plays an important role in building up ICM's own innovation capacity. In addition, ICM's interview questions yielded some additional information to further support and supplement an understanding of the initial process of innovation. This additional detail is discussed and presented below.

The Observation Stage

Firstly, the data suggests that the customer needs analysis, and the industrial trends analysis should fall into this category. One of the interviewees (ICM3) stated that ICM considers the trends in industrial changes including government policies, economics effects, market dynamics and customer behaviour before taking action. The interviewee further confirmed that the observation activities are conducted prior to the actual actions that ICM takes to complement the business strategy. According to the data, ICM observes the trends of industrial development and existing technology as a consequence of the sensitivity of senior leaders. On the other hand, the evaluation of existing products and the analysis of consumer needs represent the actions of market observation, which is seen as one of the steps of ICM's innovation model. Therefore, the themes in the Observation Stage are:

Observation Stage

1. Market Observation

-Customer Needs Analysis

-Product Observation

2. Industry Observation

-Industrial Trends Analysis

-Existing Technology Observation

The Resource Acquisition Stage

ICM's action subsequent to the observation stage is to access the existing resources. Considering the nature of the responses of ICM's interviewees, this stage mainly

concerns the variety of sources for ICM's resources. For example, 'purchase sample' and 'copy existing products' are the examples given by the interviewees of specific resources acquired by ICM, which clearly refer to acquiring existing products. Other than making use of publicly accessible products and technologies, ICM also has a number of ways to acquire external technology and knowledge. The interviewees (ICM2) indicated a number of ways to the researcher, including talent recruitment, external collaboration with enterprises and research institutions and external licensing agreements. The talent recruitment is another way that ICM accesses external technology. According to interviewee ICM2, ICM has been keen to recruit the industrial elites who are able to bring in cutting-edge technology beyond ICM's own capabilities and effectively support further innovation activities. As a conclusion, the ways that ICM accesses external resources are:

Resource Acquisition Stage:

1. Existing Products Purchase

2. Collaboration (with)

-Enterprises

-Research Institutes

3. Talent Recruitment

4. Licensing Agreement

The Understanding Stage

This research finds that ICM learns and understands the acquired technology and knowledge in different ways depending on where the source of the resources is. As stated above, ICM's major source of external resources is existing products as well as the technology within the products. Therefore, one of ICM's ways of understanding the existing technology is to do reverse-engineering of the existing product. Furthermore, external collaborative research with other research institutions and enterprises also help to improve ICM's understanding of the existing technology.

In particular, the **co-research** activities indicated in the interviews grant ICM some new insights into their own technology and external technology, which undoubtedly

improves their understanding of technology.

Understanding Stage

1. Reverse-Engineering

2. Co-Research

The Mastering Stage

The technology integration is perhaps the most important action in the next stage of mastering as all three ICM interviewees stressed its significance. In fact, when the interviewees were asked how they saw their efficiency in generating innovation, they stated that the innovation output was the product of ICM's technological accumulation. One of the interviewees (ICM2) raised the concept of 'one plus one equals more than two'. In this way, the interviewee believes that the benefit of mastering a new technology is not only limited to the newly acquired technology itself, but also the opportunity to combine the newly acquired technology with ICM's existing technology. This is referred to by the interviewee as technology accumulation. It is understandable that the combination of newly acquired technology and existing technology can further enhance the understanding of both new and existing knowledge. This stage, according to the interviewee, can accelerate the ICM innovation process as the results of the process from observation to mastery can generate more than one technological output. Moreover, in order to fully utilise the acquired resources, the interviewee mentioned the term 'technology recycling' process, which represents the process whereby ICM re-uses old technology and improves this old technology based on the understanding of newly acquired technology or the innovation results achieved by ICM. Therefore, the researcher concludes that the elements in this stage are:

Mastering Stage

1. Technology Accumulation

-Technology Integration

-Resources Integration

2. Technology Recycling

The Applying Stage

The last stage of the resource flow mainly involves the reflection of innovation output. To summarise from the interviews, this involves the improvement of existing technology; the creation of new product; and the creation of new technology that enables the application of the mastery of new technology. These are, respectively classified as incremental innovation, architectural innovation as well as radical innovation.

Applying Stage

1. Product Creation

2. Technology Creation

3. Technology Improvement

As a summary of the argument above, the interviewees suggest that ICM's innovation model follow a process that can be summarised as ***Observation***, ***Resources Acquisition*** and ***Resources Utilisation,*** and these themes interact with each other, following a logical sequence from one stage to the next. Therefore, the figure presented below (Figure 6.3) summarises the interactions between the themes.

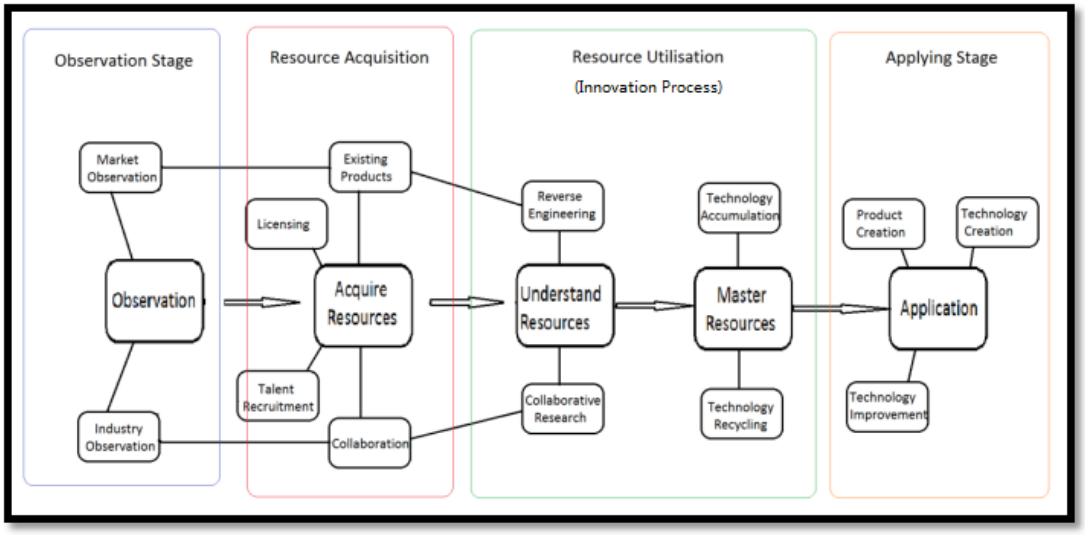


Figure 6.3: Thematic Map for ICM's Innovation Process

6.2.3. Discussion of ICM's Innovation Model

The analysis of ICM's data revealed a number of factors that lead to the superior innovation performance achieved by ICM. Mainly, these factors reflect the innovation environment that is built by ICM, the wide range of resources and its well-established innovation process. These factors are discussed in this section.

ICM's Open Innovation Paradigm

ICM's business innovation strategy aims to establish a virtuous circle. ICM takes R&D and innovation outcomes as the major method to build up their long-term and sustainable competitiveness, as interviewee ICM2 stated:

> *The way I see it, innovation capability is a long-term investment. The capital investment is necessary for R&D and innovation activities. But technology, especially the core technology, can grant our company dominance in the industry and eventually grant us the profit to sustain our innovation activities (ICM2).*

As stated by the interviewee (ICM2), ICM considers the cost of innovation activities to be a necessary step towards establishing its competitiveness. Furthermore, the interviewee (ICM2) suggests the view that innovation activities create a virtuous circle, that is, the innovation outcome creates the competitive advantage that brings profit, which can further sustain the innovation activities. For example, the interviewee (ICM1) stated that ICM has been heavily investing in the development of its own double-clutch automatic transmission (DCT) while most of the local brands are still making the inefficient and outdated single-clutch automatic transmission. If successfully developed, it will be the first independent DCT of any Chinese automotive firms. This would give ICM more technological advantage over the other Chinese competitors and, potentially, an opportunity to compete against European and American automotive firms. Ultimately, the advantage over its competitors could be turned into tangible profit, which would cover the cost of further innovation activities. Figure 6.5 below summarises ICM's virtuous circle.

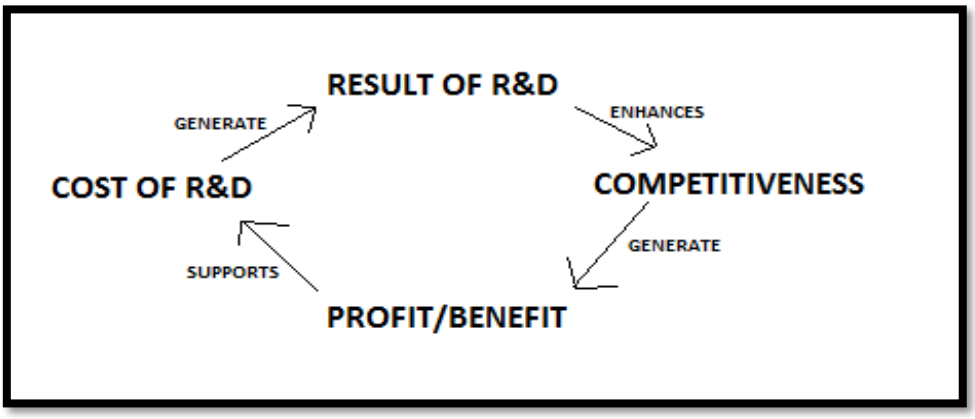


Figure 6.4: ICM's Virtuous Circle of Innovation

ICM's virtuous circle of innovation echoes the theoretical virtuous circle suggested by Chesbrough (2003) discussed previously, which concluded there was a positive relationship between the cost of R&D activities and its return. Despite the virtuous circle established by ICM, its innovation strategy seems to fall into the Outside-In Open Innovation paradigm rather than a Closed-Innovation paradigm. This is firstly because ICM has been actively sourcing external resources and research capabilities to enhance its own innovation capacity. This can be seen from its collaboration with a number of research institutions, including some high ranking universities in China, as well as the external collaboration such as the strategic partnership with Company X (An European automotive MNC, company name hidden for ethical reasons). Therefore, from the input end of the process, ICM is 'open', while at the other end of the innovation process, which is the output of the innovation, there is not clear evidence of the outflow of the under-utilised idea to other firms, such as the out-licensing of its own technology.

The interviewee participants take the improvement of existing technology, the creation of new product and the invention of new technology as the result of their innovation activities, which are used by themselves. This is especially the case considering ICM has been heavily integrating the newly mastered technology to extract as much innovation outcome as possible. Therefore, from an output perspective, ICM is 'closed'. The feature of ICM's open innovation falls perfectly into the *Outside-in Open Innovation* paradigm suggested by Chesbrough (2006).

Existing literature suggest that because there exist boundaries of R&D and the

marketing capability of a firm, the closed innovation paradigm is not always efficient. This is because, firstly, some of the innovative ideas or technology cannot be successfully commercialised by the firm; secondly, the inflow of resources based on a firm's independent capability is not always sufficient to achieve a firm's innovation objectives. Open innovation, representing the active sourcing external capabilities, was suggested to enhance the overall innovation capability within a system such as the collaboration of several firms. In the ICM case, the 'dominance in the industry' mentioned by the interviewee, which represents an absolute technological advantage over its competitors, seems to reflect the strategic intent of ICM. In achieving the organisational vision, ICM leverage its innovation activities by acquiring external collaborative capabilities, including resources capability and an R&D capability.

ICM's Innovation Process

As discussed previously, the process that ICM utilises the acquired resources represents its actual process of innovation. The resource utilisation process of ICM includes a process of a series of steps to turn the input of resources into innovation outcomes. There are some key features in ICM's process of innovation. Firstly, as stated earlier, all of the interviewees take the process of innovation as a sequential process, which means one stage only happens after the completion of the earlier stage. Secondly, all of the interviewees take the innovation outcome as the end product. Thirdly, and perhaps most importantly, ICM's innovation process model starts from both the needs of the market, and basic science and technology from the industry.

As discussed before, the current innovation theories suggest that innovation is a process of generating commercially valuable results. Such process is driven by both market need and scientific development. In this respect, the analysis of ICM case has shown there is a process of innovation. Such process of innovation is indeed driven by market trend and industrial development. Yet, the later innovation process models such as Interactive Model of innovation as well as System Integration and Networking, would otherwise suggest that the process of innovation is not always sequential and the innovation outcome is not necessarily the end product of the

process. Instead, innovation can happen at every step of the process. Perhaps the reason behind the key features of ICM's innovation process model is that ICM takes the technological innovation as their strategic focus as discussed before and, therefore, aims to enhance their technology capability. In fact, one of the interviewees (ICM3) stated:

> *The technology is the most important resources of innovation. This is because innovation starts from technology and ultimately contributes to technology (ICM3).*

In addition to this statement, the *Applying* stage summarised above, which represents what ICM believes is their innovation outcome, reflects this argument as product creation, technology invention and improvements to existing technology are seen by ICM as their innovation outcome. At this stage, it is perhaps clearer why ICM's innovation model follows a sequential process because the ultimate goal of its innovation process is to utilise the acquired resources to generate technological innovation outcomes.

6.3. Comparison between ICM and Theoretical Suggestion

Upon reviewing current literature on innovation, there are themes and factors concluded (**F1-F3**). These themes and factors formed the theoretical basis of this research as to understand the innovation behaviour. The data analysis of the case of ICM revealed a considerable amount of similarities to the theoretical suggestions. These factors are discussed below.

Firstly, the internal environment of innovation is important for innovation to thrive inside a firm. The environment of innovation (**F1**) primarily comprises the strategic focus on innovation (**F1.1**) and the commitment of resources (**F1.2**) on the innovation activities. In this respect, the ICM case revealed similar suggestions for building up an innovation-friendly internal environment and confirmed the necessity of an internal innovation environment. Therefore, it can be concluded that the necessary factor for building up an environment of innovation comprises:

Factor1 (F1):Environment of Innovation:

F1.1. Strategic Focus

-Sensitivity of Senior Leaders (Theme generated from ICM)

-Source of Competitiveness (Theme generated from ICM)

F1.2: Commitment of Resources

-R&D Investment (Theme generated from ICM)

-Training Investment (Theme generated from ICM)

Other than the innovation environment, the innovation theories, such as the well known *Open Innovation* model, suggest that having more external resources improves the efficiency of innovation activities and, therefore, increases the likelihood of generating more innovation outcomes. This argument is concluded in literature review as **F2** (resource accessibility). In the case of ICM, it has been actively sourcing external resources to improve its own technological and innovation capability, thus demonstrating these aspects of *Open Innovation.* It was concluded before that the ways ICM accesses external resources comprise acquiring existing product samples, licensing agreements, recruiting talents with the capability of new technology, and collaboration with other research institutes. It is understood by this research that the important factor is to have a wide range of external resources that can benefit the firm's innovation activities. Therefore, **F2 (Resource Accessibility)** concluded in literature should include:

Factor 2 (F2). Resource Accessibility

-External Product (Theme generated from ICM)

-External Knowledge/Technology (Theme generated from ICM)

Additionally, the actual process of innovation (**F3**) is also recognised by current literature on innovation as important factor. The theoretical innovation process models highlight the significance of the market (the needs) and industry (the basic science) as they are both drivers of innovation activities. This is concluded in the literature review Section 2.3 as **F3.1**. In this respect, the data analysis of ICM suggests that ICM takes action to innovate from both the needs of the market and basic science, which reflects the fundamental ideas of the market push model and the need pull model.

Additionally, ICM has an established way of utilising the acquired resources to

generate innovation results, which represents its actual process of innovation. As discussed before, none of the current theoretical innovation process model is comprehensive enough to fully understand the process of innovation and predict innovation results. Hence it would not be appropriate to take any of the current theoretical innovation process models, such as linear models, interactive model or integrated model as a framework. In the same way, it would not be appropriate to suggest that ICM's actual process represents best possible practice.

Nevertheless, the innovation process of ICM provides some insights of the process of utilising the input of resources to generate innovation results. It was established previously that ICM started its automotive business by acquiring an automotive firm without a substantial amount of capability, especially in terms of technology. Considering the fact that ICM has been successful in generating innovation results, ICM's process of innovation should be taken as a valuable reference as to understand the process of innovation in the context of automotive industry in China. Hence this research takes ICM's resource utilisation process as a framework of innovation process to examine the innovation process within a firm.

In the context of IJVs, the model of Pak et al (2015) provides some insights of what the innovation process within an IJV can be. It suggests that the innovation process within an IJV starts from combining the resources from parent companies (resources migration stage, concluded as **F3.2**). Then the input of resources were modified and adapted by the IJV (resource adaptation stage, concluded as **F3.3**), which eventually leads to innovation outputs that can be harvested by it parent companies. In this respect, the process suggested by ICM and Pak et al (2015) shares some notable similarities as they both suggest a sequential process from acquiring resources to utilising the acquired resources to generate innovation output. Therefore, the process of innovation, as learnt from the case of ICM and the model of Pak et al (2015), is concluded in this research as the ***Resource Utilisation Process.*** Based on the suggestion of both ICM and current literature, the essential factors in this stage should include:

Factor 3 (F3). Resource Utilisation Process (Innovation Process)

F3.1: Market & Industry Observation (Both literature review and ICM)

F3.2: Resource Understanding Stage (Theme generated from ICM)
(Resource Migration Stage In the Context of IJVs)

F3.3: Resource Mastering Stage (Theme generated from ICM)
(Resource Adaptation Stage In the Context of IJVs)

The comparison between the data analysis results of ICM and factors concluded in literature are presented above. Such comparison revealed a considerable amount of similarities, which can explain the superior innovation performance of ICM. The suggestion of both theoretical literature and the case of ICM leads to the themes and factors as to understand the innovation behaviour. The data analysis of the three selected IJV cases will be carried out and presented in the following sections according to with these factors and themes.

II Data Analysis of IJV Cases

It is suggested by both current literature on innovation and the case of ICM that the internal environment of innovation (**F1**), the accessibility to resources (**F2**) and the actual process of innovation (**F3**), represents the factors to understand the innovation behaviour of a firm. Other than these factors, it is recognised that a joint venture company is fundamentally different from an ordinary company such as ICM due to the involvement of at least two companies from different host countries. Specifically, the literature suggests that the IJV partnership can create an opportunity for mutual learning which improves the capability of both involved parties. This is not indicated in the data analysis of ICM. Therefore, **F3.4** (mutual learning effect) should also be considered.

Moreover, current literature on IJVs suggests that there are a number of factors that can influence the stability of a joint venture collaboration, which can result in the ineffectiveness of co-operation and even the collapse of the partnership. These factors influence the effectiveness of the environment creation, the transfer of resources and the actual process of resource utilisation. As concluded in the

literature review, **F4** (stability of an IJV) which include **F4.1** (suitability of partners) and **F4.2** (instability factors), can influence the effectiveness of operation of an IJV. Without knowing the stability of the selected IJVs, the data analysis results are considered invalid to conclude research results. So it should be firstly examined before presenting the data analysis of IJVs. The data analysis of each IJV case is presented in four distinct parts, the four parts will is presented below.

Table 6.4: Structure of IJV Cases Analysis

Parts of Analysis (Themes)	**Factors to be assessed**
Part 1: Stability of IJV (**F4**)	**F4.1:** Suitability of partners
	F4.2: Instability Factors
Part 2: Innovation Environment (**F1)**	**F1.1:** Strategic Focus
	F1.2: Resource Commitment
Part 3: Resource Accessibility **(F2)**	**N/A**
Part 4: Innovation Process (Resource Utilisation Process) **(F3)**	**F3.1**: Observation over market and industry
	F3.2: Resource Migration Process
	F3.3: Resource Adaptation Process
	F3.4: Mutual Learning Effects

The data analysis will be presented in accordance to the four distinct parts as stated above. As discussed before, the design of interview questions covered these themes (**F1-F4**). The interviewees' responses to the interview questions have indeed revealed some important evidences as expected. These evidences are used to examine the four main themes and the factors that influence the innovation performance of the selected IJVs. Other than the main themes, the interview question design includes two sets of question that concern the business strategy of the parent companies and the innovation progress of IJVs and their parent companies. The answers to these questions are anticipated to implement the main themes of the interview question.

6.4. IJV Case 1: JV1

6.4.1. Data Analysis Part 1: Stability of the IJV

As a joint venture involves at least two partners from two host countries, it can often be unstable and causes issues in the co-operation of the joint venture company. This section will examine the stability of the IJV by examining the suitability of the two parent companies and other stability/instability factors.

The Suitability of the Involved Parties

Like other automotive MNCs, JV1F's motivation for starting an IJV, other than meeting the requirements of the Chinese government, is to fully utilise the local resources in order to acquire as much local share as possible, as commented on by one of the interviewees (JV1F2):

> *Market share is the probably most important factor. Obviously, China is an enormous market and we can't afford to just leave it. Therefore, we have to do a joint venture in China. But we can also access the local knowledge including the Chinese culture, the local market, the behaviour of Chinese consumers and so on (JV1F2) .*

A similar statement is made by interviewee JV1F1:

> *We recognise the market potential of China and take China as an important part of our global strategy. The local partner also helped us with some local problem. Such as understanding the local market, the Chinese culture, and the way how Chinese people do business (JV1F1).*

On the other hand, JV1L recognised the large market potential of the JV1F cars and expected to learn from JV1F and ultimately enhances its own capabilities through the joint venture, as one of the interviewees (JV1L3) pointed out:

> *Initially our goal of starting the joint venture is to let Chinese people to be able to drive the luxury car. Of course, JV1F is a globally well-known premium car maker. Cooperating with JV1F can improve our own industrial capability. So we went to JV1F and see if they can collaborate with us. After our efforts, we reached an agreement with JV1F and finally brought JV1F brand to China*

formally (JV1L3).

According to the interviewee, JV1L actively sought collaboration with JV1F so that the collaboration would enhance its capability. In fact, JV1L's technology and production capability was limited, as mentioned before. Yet, as a typical local Chinese automotive firm especially considering it has successfully developed and marketed a popular model, JV1L is capable of substantial local knowledge. The collaboration, according to interviewee JV1L3, allows JV1L the opportunity to learn from JV1F and implement their overall business strategy of making independent passenger vehicles:

> *Our strategy is simple, to learn from a highly advanced foreign car maker in order to develop ourselves. The collaboration with JV1F has brought us a substantial amount of profit and the opportunity to learn from them. (JV1L3)*

In order for JV1L to develop itself, it expected a substantial amount of technology capability from its joint venture partner, and it seems JV1F perfectly met this criterion. JV1F, on the other hand, also aims to ensure its partner can provide sufficient support for its local production in China. Its partner could ultimately implement JV1F's global strategy as well. JV1F applied specific criteria in selecting an IJV partner, as summarised in Table 6.4:

Table 6.5: JV1F's Partner Selection Criteria

Criteria	Stated by	Description
Availability	JV1F1, JV1F2	Is the local partner available to form a joint venture partnership with JV1F?
Exclusiveness	JV1F1, JV1F2, JV1F3	Does the local partner already have an IJV partner and will it have a IJV partner anymore?
Capability	JV1F1, JV1F2,	Is the local partner's capability satisfactory for establishing the IJV?
Willingness	JV1F1	Is the local partner willing to form a joint venture partnership with JV1F?
Dominance	JV1F3	Can JV1F dominate in the decision-making process in the partnership to ensure the harmonious operation?
Reputation	JV1F1, JV1F2	Does the local partner have a good reputation?
Deal Detail	JV1F3	Can both parties agree on a contractual deal that benefits both parties?
Regional Cost	JV1F1, JV1F2	Is the local land and personnel cost good for the IJV?

Criteria such as *availability*, *willingness* and *location cost* are essential considerations

before starting a joint venture partnership. Other than this, it is also important to highlight that the *dominance* and *exclusiveness* are also the consideration of JV1F. Firstly, all of the three interviewees mentioned exclusiveness, which represents the insistence of JV1F that its joint venture partner make a contribution to only one joint venture company. As a matter of fact, some other automotive firms, such as JV3L or JV2L, have more than one international joint venture partner. Such an insistence was made by interviewee JV1F2 as being important to ensure the success of the joint venture company as JV1F believed that being involved in more than one joint venture could hinder the success of the collaboration with JV1F.

On the other hand, interviewee JV1F3 mentioned 'dominance' in the partner selection criteria, which represents JV1F's desire of taking full control over the joint venture company. According to JV1F3, JV1F is more capable than JV1L to a large extent, and the negotiation with the local partner is time-consuming and can also cause conflict between partners. The dominant control of JV1F could improve the performance of the joint venture company by simplifying the decision-making process. It is, in fact, discussed before that the dominant control by the foreign party, especially in the early stages of IJVs, can reduce the instability issues and consequently improve the performance of IJVs (Yan and Luo, 2001; Li et al, 2011).

The joint venture deal between JV1F and JV1L was finalised in 2003, which is relatively late compared to JV1F's European and Japanese rivals. At the time, the major European and Japanese brands had already established their local joint venture companies. Considering JV1F's partner selection criteria, especially with regard to 'exclusiveness' and 'dominance', JV1F's choice seems to have been limited to JV1L as most of the local Chinese car makers already had a joint venture partner. It should also be highlighted that around 2003, as mentioned before, the overall capability of JV1L, including its technology, production and R&D capabilities, was limited. JV1F, as its joint venture partner, has always been a major player of global premium car maker. There was, therefore, a large gap between the capabilities of the two involved partners. The consequence of this is that the relationship between the joint venture partners was more of a teaching-learning process, as interviewee JV1L2 stated:

The cooperation with JV1F is more like a teaching-learning process. JV1F has always been teaching us something that we don't know, such as advanced technology and management techniques (JV1L2).

Despite the fact that the technology capability of JV1L was limited, JV1L made an important contribution to the joint venture, as pointed out by interviewee JV1L1:

We as the Chinese party (JV1L and local government) have made a lot of efforts to facilitate the establishment of the joint venture, including providing a favourable policy, a public relationship (local), local land and local talent (JV1L1).

The importance of the complementary strength of the involved parties is suggested in the literature. as it is the reason why two parties come together to form an IJV partnership. The data analysis in this section suggests that both JV1F and JV1L meet the requirements for each other as they each bring complementary assets to the IJV. There seems, therefore, to be a good mutual suitability for the two parties. Despite this, the data revealed that there exists a substantial gap between the technological capabilities of the two parties. It is, in fact, a common phenomenon in any Sino-foreign automotive IJV as most Chinese car makers are not capable of providing a substantial amount of cutting-edge technology on entering these partnerships.

Stability/Instability Factors of the IJV

Overall, both JV1L and JV1F fully recognise the substantial market potential of China, which represents the common benefit of the two parties. Despite this, the strategies of JV1L and JV1F are fundamentally different as JV1L expects to improve its own capabilities through the collaboration while JV1F expects to access local knowledge and local support. Yet, it seems that that it is this difference that brought the two parties together to form an IJV because, as pointed out by the interviewee, both each party needs to access the other's capabilities. Hence there is mutual reliance between the partners on the basis of complementary resources.

Additionally, JV1L and JV1F are not competing with each other as JV1F targets the premium car market while JV1L focuses on the mini-bus and low-priced, affordable passenger cars. Therefore, any perceived risks in collaborating (for example, relating

to transferring technology) are minimal. Interviewee JV1F2 confirmed this by stating:

> *No I don't think there is any risk (of transferring technology). Because we focus on different market, we are not competitor. A joint venture company is a collaboration not a competition (JV1F2).*

Likewise, interviewee JV1L3 made a similar statement:

> *Our product is different from JV1F's. We do not expect to compete with JV1F, we are looking to improve ourselves as much as we can, based on what we have learnt from JV1F (JV1L3).*

It can be concluded at this stage that the overall strategy of JV1F and JV1L are different but they share a common goal of making a profit in the market of China; there existed a substantial technological gap between JV1F and JV1L yet the two parties need to rely on each other's resources to operate the IJV. Also, the two parties are not in a competition relationship as stated by the interviewee. Therefore, it can be concluded that the JV1 joint venture is considered as a 'classic' joint venture as two parties aim to access the resources of each other as classified by Beamish (2008). Beamish (2008) considers this type of joint venture to be stable because the involved parties in this type of joint venture access and utilise each other's resources rather than create an internal competition environment by attempting to take over the capability of each other. The 'Dominance' required by JV1F, as indicated by the JV1F interviewee, reflects their insistence on taking absolute control over the joint venture. This has been achieved during the operation of the IJV as one of the interviewees, JV1F3, pointed out:

> *JV1F dominate in the decision-making process. The Chinese party only take part in the discussion process yet they are not able to influence the decision-making process. Because JV1L is not capable of good technology and production knowledge. (JV1F3).*

Similar statements were also made by two of the interviewees of the JV1L side of the joint venture:

> *The relationship between us and JV1F is like a teaching-learning process and*

therefore most of the decisions were made by JV1F." (JV1L1); JV1F normally decide what and how we should do, because they know something we don't. (JV1L3)

The evidence above shows that JV1F has dominated the decision-making process due to the substantial capability gap between JV1L and JV1F. The dominant control by one party, according to the literature review, generally brings better stability to a joint venture company by reducing the possibility of inter-partner disagreement (Killing, 1993; Geringer and Hebert, 1989). Despite this, inter-partner conflicts are recognised by interviewee JV1F1:

There are always conflicts in any partnership. But we need to consider our common goal, which is to get market share and make aprofit, and therefore we try to keep a harmonious cooperation. (JV1F1)

Interviewee JV1F3 further explained the conflicts:

The major conflict of benefit between JV1F and JV1L is that JV1F aims to sell JV1F cars, including those which are made in Europe and America, while JV1L aims to maximise its benefit by producing and selling more locally produced JV1F cars. Both parties respect each other's benefit and they work towards the common goal. (JV1F1)

A similar statement was made by interviewee JV1L2:

It (the conflict) is mostly about whether JV1F should introduce more imported products from Europe. The solution is to consider our common strategy goal and balance it. (JV1L2)

JV1F and JV1L both expect to maximise the benefit that they can get from the Chinese market. From the point of view of JV1L, making and selling as many locally produced cars as possible seems to be the way to maximise its own benefits, while JV1F does not seem to take the production location as seriously as JV1L. The commitment of JV1L, including having only one IJV partner and letting JV1F dominate in the IJV, leads to a high expectation that JV1F should consider its benefit as well. Therefore, the conflict is understandable. According to interviewee JV1L2, the solution to the major

conflicts was resolved by both parties reaching an agreement to transfer the production of more JV1F models to the IJV, which brings more mutual benefit to each party. Other than this major conflict that is mentioned by both sided of the IJV, there is no evidence that suggests other operational conflicts within the IJV, possibly due to the dominant control by JV1F.

As a conclusion, the evidence seems to suggest that the IJV is operating with good stability. This is, firstly, because the two parties seem to have good suitability due to the fact that both of them share a common strategic goal and complementary strength. Secondly, there is no hard evidence that suggests the instability issues of the IJV despite the recognised conflicts of benefit which were resolved internally. Thirdly, the dominance that was achieved by JV1F further strengthened the stability of the joint venture. According to the literature, IJVs often suffer from instability issues that limit the performance of the IJV operation. The evidence summarised and discussed in this part seem to suggest that this is not the case with the JV1 joint venture.

6.4.2. Data Analysis Part 2: Innovation Environment

The previous part of the data analysis suggested that the joint venture partnership between JV1L and JV1F has been stable due to a number of reasons. Yet the current literature would suggest that the internal environment for innovation (**F1**) is another important factor that influences the innovation performance of a firm. Therefore, this part of the analysis is going to focus on the qualitative data that is relevant to the environment of innovation of the IJV. As concluded in both ICM's data analysis and the literature review, the strategic focus on innovation (**F1.1**) and the resources commitment on innovation (**F1.2**) activities are significant for building up an organisational innovation environment. The relevant data for these points were selected and presented in this part of the data analysis.

Strategic focus on Innovation

First of all, the evidence suggests that JV1F does not consider innovation to be a strategic focus for the IJV operation, as suggested by JV1F3:

The joint venture company is not meant to be a major vehicle for the

innovation achievement of JV1F. It is rather a means to starting production in China. But we do expect the IJV to innovate as much as possible (JV1F3).

A similar point is made by interviewee JV1F2:

Innovation is not one of the strategic focus, but we make use of local resources to improve our products (JV1F2).

The two interviewees made it clear that the joint venture was not expected to deliver a substantial amount of innovation outcomes; rather, it acts as a means to enter the China market. Though the interviewee JV1F1 stated:

It (innovation) is something we expect to see from the joint venture, especially with regards to the new energy vehicles (NEVs) (JV1F1).

It is clear that JV1L was unable to support the development of NEVs to any great extent given JV1L's technological capabilities. In addition to this statement, interviewee JV1F1 also said:

We can see how our cars and our technology evolve in China when we use the local resources to improve them (JV1F1).

The examples given by the interviewee include the locally made saloon cars, which are made with some interior and exterior changes. Such modification can, however, be only viewed as *incremental innovation*. On the other hand, JV1L takes the innovation enhancement as one the main reasons why JV1L collaborates with JV1F, according to interviewee JV1L1. The strategy behind the collaboration with JV1F, as commented on by interviewee JV1L3, is that:

We (JV1L) can enhance our own innovation capability after fully consuming and digesting what we have learned from JV1F (JV1L3).

The underlying meaning of the two interviewees is that JV1L takes the JV company as a learning platform to access the knowledge and technology of JV1F. The ultimate expectation of such a learning platform is the establishment of JV1L's own technology capability, as suggested by interviewee JV1L2:

As you see, we have been learning from JV1F, we have always been gradually improving our own production line, management team and the technology we

use (JV1L2).

The view of the JV1L interviewee (JV1L2) reflects that of JV1F1 above, in that the incremental changes made to the existing JV1F models are the main innovation outcomes achieved in the IJV:

Our innovation achieved in the IJV mainly reflects the changes that were made to existing JV1F products. Such as lengthening the wheel base, the changes made to the interior (JV1L2).

In summary, neither JV1F nor JV1L expect the IJV company to achieve a substantial amount of innovation achievement, although both parties recognise the significance of innovation for the parent companies. Despite the common strategic goals, JV1F mostly takes the IJV as a means to entering the China market and starting production locally, while JV1L takes the IJV as a platform for learning from JV1F. Therefore, innovation itself is not the strategic goal of the IJV company, and the leadership is not prioritising innovation achievements in the IJV is. Yet, as the main purpose of the IJV company is to collaboratively produce existing JV1F cars, the competitiveness mostly comes from the technology that originated in JV1F. Hence, the sources of competitiveness do not mainly come from the innovation that is achieved by the IJV itself. For the same reason, there has not been clear evidence from the interviews that the IJV company is encouraging the employees to fully get engaged in the innovation activities.

Resource Commitment

Both ICM's data and the current literature suggest that the commitment of resources (**F1.2**) in the innovation activities plays an important role in creating an environment of innovation. ICM's data analysis revealed that a commitment of resources can give the employee the flexibility to get engaged in the innovation activities. More specifically, ICM's data would suggest that the investments on R&D and staff training reflects the company's commitment of resources in the innovation activities. Nevertheless, as discussed above, neither JV1F nor JV1L truly expects a substantial amount of innovation achievement from the IJV. Consequently, the IJV itself has not achieved much innovation outcomes. Despite this, interviewee JV1L1 believed that

JV1L has been making an investment in the innovation activities:

> *We spend a large sum of capital and personnel resources to do the R&D together with JV1F. We expect to achieve the independent R&D capability eventually (JV1L1).*

Perhaps the word 'eventually' reflects the fact that JV1L does recognise that the ultimate goal of the collaboration with JV1F is to build up its own technological capability, yet such a goal is unlikely to be achieved in the short term. Interviewee JV1L3 further expanded on this theme,explaining the relationship between the investment and return on the innovation activities.

> *Initially, some investment is necessary because there is a gap between our capability and JV1F's capability. Such investment is hard to be effective in a short term but we can benefit from it in the long run (JV1L3).*

This statement is similar to ICM's argument that the innovation investment is a long-term one. Interviewee JV1F1 also commented on the investment that JV1F made to enable innovation to happen in the local China production:

> *(JV1F has made investment on) the new energy vehicle. the Model X (a hybrid saloon car, model name removed for ethical reasons) car was actually designed and made in China, and they are sold specifically in China (JV1F1).*

The development of NEV was discussed in part 1 of the JV1 data analysis, and according to interviewee IE2, the development process was mostly conducted by JV1F for political reasons, while the contribution of JV1L was denied to a large extent:

> *JV1F answered the call of the Chinese government and developed the Model X. Because the Model XS (the standard version of Model X, model name removed for ethical reasons) is the most popular model of JV1. But to be honest this (the development of the Model X) has not got too much to do with JV1L.*

That the Chinese government is pushing the development of NEVs by making policies favourable to NEV car makers, as discussed in Chapter 1. This is the more likely explanation for the motivation behind JV1F's intention of making the Model X specifically for the Chinese market. In addition to this, JV1F3 further stated that:

JV1F established an R&D centre in China with JV1L but it focused more on the analysis of the customer needs instead of technological R&D (JV1F3).

Therefore, it seems the R&D investment is the reaction to the requirements of the Chinese government. Other than the investment that JV1F made on the NEVs, JV1F also commits resources in the training of local personnel, as stated by interviewee JV1F1:

Yes, we do provide constant training to our joint venture partner. The training programme covers both technology and management knowledge. We bring joint venture people to Europe for good quality training. We also teach the local party how to produce some key components. For example, we teach JV1L how to make the N20 engine, and put it in local production (JV1F1).

Similar statements were made by both JV1F2 and JV1F3, yet it seems that all of the training that was provided by JV1F aims to help JV1L to close the technological gap between JV1F and JV1L. Likewise, interviewee JV1L1 confirmed this statement:

JV1F provides us with training and teaching, including the production, management and some technology training. JV1F also regularly takes personnel from Chinese party to European to do the training (JV1L1).

In summary, both parties have made an investment in the innovation of the joint venture company and the investment can be a joint decision despite the different strategic focus of the two parties. Yet, neither of the parties seems to expect a substantial innovation outcome from the IJV, and the investment seems to be made to implement the overall goals. As a conclusion, the innovation environment of the JV1 IJV does not seem to fully support the thriving of innovation internally.

6.4.3. Data Analysis Part 3: Resource Accessibility

The previous section discussed the environment of innovation but it is also suggested by both ICM's data analysis and the current innovation literature that the resource input can influence the innovation performance of a firm. It is the same logic behind the suggestion of the current literature that the IJV benefit from the direct access to the resources of the involved companies and therefore is considered to be a vehicle

for driving innovation. It is also suggested that the complementarity of the resources of the involved parties also plays an important role in the operation of IJV and the inter-partner learning, which ultimately influence the innovation achievement in the IJV. Therefore, this section of the data analysis will to look at the resource that was accessible to the IJV.

It was discussed before how the resources of each party are inaccessible to each other without the IJV partnership and, consequently, both parties gain from sharing the complementary resources. Table 6.6 summarises the resources that were believed by the interviewees to be important to the IJV operation.

Table 6.6: Resources that are important to JV1

	JV1F1	**JV1F2**	**JV1F3**	**JV1L1**	**JV1L2**	**JV1L3**
Local Resources	Local Knowledge	Local Knowledge			Local Knowledge	Local Knowledge
	Local Support	Local Support	Local Support	Political Support		
	Local Talent				Local Talent	
						Distribution
Common Resources	Capital	Capital	Capital	Capital	Capital	Capital
Foreign Resources	Production Knowledge		Production Knowledge	Production Knowledge		Production Knowledge
	Technology	Technology	Technology	Technology	Technology	Technology
	Mgmt Knowledge		Mgmt Knowledge		Mgmt Knowledge	
				Established Product		Established Product

As can be seen from the table, the commitment of both local resources and foreign resources are recognised by the interviewees as important factors in the operation of the IJV. In fact, the interviewee JV1L1 sees technology and management knowledge as the most important factor in the operation of a firm:

I personally think that the talent is the most important resource. The basic element of any firm is people. People can bring us technology and

management experience, finally improving the capability of the firm (JV1L1).

Although talent was stated by the interviewee as the most important resource, it is clearly suggested that JV1L's ultimate expectation from the talents is the enhancement of technological and managerial capability, which is what JV1L expects from JV1F. However, interviewee JV1F3 from the JV1F side looks at this differently:

The absolute majority of resources are contributed by JV1F not JV1L. (Including) technology, management knowledge and capital. JV1F dominates in the joint venture and JV1F decides what resources to be contributed and where to use them in joint venture and JV1L follows the decision made (JV1F3).

It seems that interviewee JV1F3 believes that the critical resources to operate the IJV is JV1F's technology and knowledge. Despite the fact that these resources are indeed contributed to by JV1F, interviewee JV1F3 also recognised the contribution that is made by JV1L.

Even though the capability of JV1L is limited, JV1L has made auseful contribution to the joint venture. Such as the relationship with government, analysing the local customer need, in fact, most of the PR are Chinese people (JV1F3).

The comments by interviewee JV1F3 are confirmed by interviewee JV1L2:

Our contribution of resources mainly reflects the local resources, including the local plants, the connection with governments and so on. JV1F mainly contributes their products, including the necessary technology and production procedures, and management techniques. (JV1L2)

At this point, it can be concluded that both parties are contributing the resources that they believe to be important. The technology and the knowledge of production and management were mostly supplied by JV1F, while JV1L provides the local resources, including local PR and local knowledge. These resources are important to the operation of the IJV. As discussed before, the specific resources of each party are inaccessible without the IJV partnership, which creates a mutual dependency, and the literature suggests that the resource complementarity is critical for the success

of IJVs. Both JV1F and JV1L recognise the complementarity of the contributed resources, as noted by JV1F2:

> *I think they (the resources contributed by both parties) complement each other and it's working fine at the moment. None of the two parties can go alone without the partner (JV1F2).*

Interviewee JV1L1 made a similar point:

> *JV1F needs our local knowledge and connections to operate a joint venture. We need JV1F's advanced technology and production knowledge in order to establish local production. We need each other, we have always been helping each other (JV1L1).*

The data analysis of ICM suggests that it has been fully utilising the external resources to complement its innovation capability by understanding and utilising the acquired resources. This reflects why the innovation theories, such as the *Open Innovation theory*, stress the significance of external resources via external collaboration. Similarly, ICM's data analysis revealed evidence that ICM has been actively sourcing external resources to boost innovation activities, such as licensing agreements, purchasing existing products and R&D collaboration. ICM, as an independent company, seems to be free to choose its external resources while JV1L is limited to the resources of JV1F alone.

In the case of JV1, the evidence suggests that the IJV company is dominated by JV1F due to the considerable gap between the capabilities of the two parties, and JV1L is constrained by JV1F's insistence that JV1F collaborate exclusively with them. Despite the transferred resources, there is no evidence that the JV1 joint venture attempted to source external resources beyond the capability of the parent companies. This suggests that the JV1 joint venture followed a *Closed Innovation* paradigm because there is no evidence of external resources and any innovation outcomes seem to rely solely on the resources of the parent companies and are only for the benefit of the joint venture and its parent company. The limitation of the closed innovation paradigm, as discussed in the literature review, is that the inflow of resources is limited to the capabilities of the company itself. This not only limits the inflow of

resources, it also causes reliance on JV1F. Therefore, as a conclusion, the resource accessibility does not seem to support the innovation activity inside the joint venture.

6.4.4. Data Analysis Part 4: Resource Utilisation Process

Current literature on innovation and the ICM case analysis suggest that the innovation process is another important factor in building up innovation capacity. ICM's process for utilising absorbed resources includes two stages: understanding stage and mastering stage. Yet the JV1 joint venture accesses resources in a rather different way than ICM. The previous section suggested that the JV1 joint venture only benefits from the resources of the two parent companies. In fact, the model of Pak et al (2015) provides some insights of what the innovation can be within the context of IJVs. The model suggests that the transferred resources are combined and modified in the IJV to create new knowledge. The newly created knowledge can be then transferred back and benefit the parent company itself. The previous sections of the data analysis revealed evidence that there are resources that were transferred to the JV1 joint venture. This part of the data analysis will look at mechanism of how JV1 utilise the transferred resources to generate innovation outputs in accordance to the model of Pak et al (2015).

The Resources Migration Stage

The previous section of the data analysis suggests that most of the resources were contributed by JV1F. It is particularly the case with regard to technology and knowledge resources due to the substantial gap between the technological capabilities of the two parent companies. This is, as discussed before, why JV1F dominates the decision-making process in the joint venture. All of the interviewees of IJV cases were asked to describe how they utilise their acquired resources. In response, interviewee JV1F1 argued that the resources utilisation process was based on the joint discussion of the two parties:

> *The board of JV1 discusses how to use the resources together and make joint decisions together. Then the technology and the production techniques are transferred to the joint venture company to let the joint venture function.*

(JV1F1)

Similarly, interviewee JV1F2 stated:

> *We bring the technology from Europe to China and put it into local production in order to serve the (joint venture) company (JV1F2).*

Despite the fact that interviewee JV1F1 takes the resources utilisation process as a collaborative effort, both JV1F1 and JV1F2 take the existing technology and the production knowledge of JV1F as the necessary resource to operate the IJV, and the way to utilise them is to simply put them in use in local production. Interviewee JV1F3 expanded on the answer and saw the resource utilisation process as a teaching-learning process:

> *JV1F teaches the local employees how to make cars. Such as the standardised production process, the company management and some of JV1F's technology. JV1L has no discourse power. JV1L only provide advice and they follow the procedures of JV1F. The resources it used only by the joint venture company and nowhere else (JV1F3).*

JV1F3's statement denied the argument of JV1F1 that the decision was made jointly. It is perhaps more important that JV1F3 stated that the joint venture company uses new knowledge based on the teaching of JV1F. Interviewee JV1L1 confirmed the argument of JV1F3 by stating:

> *JV1F brings us their technology and production line and then teach us how to use them. We use them according to JV1F's instruction (JV1L1).*

A similar argument was made by interviewee JV1L2:

> *We will firstly absorb the new technology. Then we understand the new technology with the support of JV1F. Then we modify it together with JV1F based on the local condition, such as local supply and local market (JV1L2).*

Interviewee JV1L2 brings more insights into the innovation process by mentioning an absorb-understand-modify process, which reflects how the transferred resources from JV1F flows and evolved in the joint venture company. Although the JV1F interviewees suggest that transferring JV1F's knowledge is primarily to ensure that

the IJV can function, there is also evidence that JV1F plays a role in teaching JV1L how to utilise the transferred resources.

Resource Adaptation Stage

Echoing the model devised by Pak et al. (2015), there is evidence to suggest that JV1F's resources have been modified and adapted in JV1. In fact, this has been recognised by JV1F and JV1L. For example, JV1F1 states:

> *We need to make sure our cars adapt to local environment and therefore we modify them accordingly. The decisions were made by the board of the joint venture, on the basis of the understanding of local environment. It is a collaborative effort (JV1F1)。*

In contrast, interviewee JV1F3 confirmed the argument that both JV1F and JV1L take part in the modification of existing product, yet the interviewee argues that the contribution of JV1L is insufficient:

> *Some of the components were adjusted to adapt the local condition. Yet, they are largely done by JV1F as JV1L is not capable of making modifications to JV1F cars. JV1F HQ does regular investigations on the changes in local conditions. JV1L takes part, yet they provide little real support (JV1F3).*

It seems that the disagreement was mainly about whether JV1L has made sufficient contribution to the modification. Despite this disagreement between two partners, it was made clear that there is indeed a role for JV1L in taking part in the modification activities.

It is also important to highlight that the resources were indeed modified after being transferred to the joint venture company to better adapt to the local environment. On the other hand, interviewee JV1L2 from the JV1L side of the joint venture recognises the influence of local knowledge in the evolution of JV1F's technology:

> *We do collaborative R&D with JV1F. We provide our understanding about the local market and industry while JV1F provide technical support. Both the local knowledge and the technical support are important for the modification of JV1F's product (JV1L1).*

Interviewee JV1L2 supported the argument of JV1F1 that the modification was a collaborative effort. The examples of the modified JV1F product, according to JV1L1, include the lengthened Model Y and Model X (model names removed for ethical reasons) cars with suspension, engine and interior changes made to them. A similar statement was made by interviewee JV1L3:

> *There are not many collaboratively developed new products. But we do collaboratively make changes to existing product to better suit the needs of local Chinese consumers (JV1L3).*

According to the model proposed by Pak et al (2015), the involvement of both parties in modifying the transferred resources improves both parties' understanding of knowledge and they can, therefore, create new knowledge based on the new understanding. Additionally, according to the literature, these innovation outcomes are classified as *incremental innovation* as they represent the minor changes that were made to the existing technology and products, which do not involve the improvement of existing technology or introduction to new technology. As interviewee JV1L3 stated, there does not seem to be any co-researched new product by the joint venture company, with the possible exception of the Model X car discussed previously. Yet, this is largely the result of JV1F's efforts rather than a collaborative result, as mentioned before.

Mutual Learning Effects

The current literature on the IJVs suggests that a joint venture partnership creates an environment for inter-partner learning, which consequently improves the capability of involved parties and ultimately increases the likelihood for innovation to happen in the IJV. In the case of the JV1 joint venture, there is evidence that mutual learning has been taking place in the joint venture, as noted by JV1F2:

> *JV1L has learnt a lot from JV1F. This includes technology, production and management know-how. We (JV1F) have learnt a lot from JV1L as well, such as local knowledge, the way Chinese people do business and the local consumer behaviour. These factors are equally important. It is a two-way learning process (JV1F2).*

Interviewee JV1F2 adds to this by stating:

> *(JV1F has learnt the) diversified management style in a dynamic environment which involves multi-national culture (JV1F2).*

As discussed before, JV1L expects to access JV1F's technology and knowledge while JV1F intends to access the local knowledge and local support provided by JV1L. Both parties rely on each other due to their complementary capabilities that are inaccessible to each other without the collaboration. Interviewee JV1F3 acknowledged the learning effect, yet the interviewee also recognised the 'technology and industry barrier':

> *(JV1L has learnt) a lot indeed. Majorly management, the internal efficiency of an organisation. Technology wise, JV1L has also learnt something from JV1F, but there exists a technology and industry barrier. It's not easy to fully master the technology of JV1F (JV1F3).*

The barrier seems to echo the gap between the capability of the two parties and limited the learning effects. A similar argument is made by IIE2, as the interviewee claimed:

> *In some cases, even if the detailed design were transferred to them (the Chinese car makers), it's unlikely that they could produce the same thing because of the industrial capability (IIE2).*

The consequence is that though JV1L benefits from the opportunity to learn from JV1F, JV1L still relies on JV1F, as noted by JV1L2:

> *We have learnt a lot from JV1F, including the production techniques, the management knowledge and technology. But we still can't go alone. (JV1L2)*

In summary, both parties recognise that they both need to utilise the resources and capability of each other and each party needs to and, indeed, does learn from each other. The results of the inter-partner learning have improved the capabilities of both parties, which is fed back into the parent company.

As a conclusion to this part of the data analysis, the resources utilisation process within the IJV does not appear to have greatly supported innovation within the IJV.

There is no evidence to suggest that JV1 innovate on the basis of industrial development. The evidence suggests that the resources that are transferred from both parent companies are utilised to support the functioning of the IJV instead of generating innovation results. Despite this, there is evidence that the transferred resources are modified during the operation of the joint venture and incremental innovation results have been achieved. Due to the technological gap, the modification of JV1F's products seem to the combination of existing product of JV1F and the local knowledge. Despite this, the process of modification it creates is an opportunity for inter-partner learning, which improves the capability of both JV1L and JV1F. Additionally, there is evidence that JV1F teaches the local partner how to use the transferred resources, which improves the understanding of the local partner, thereby helping close the gap in the technological capability.

6.4.5. Conclusion to the JV1 Case

With regards to the stability of the IJV (**F4**), the evidences show that JV1 seems to operate with good stability. This is firstly because the evidence from the data seems to suggest that JV1L and JV1F are suitable for establishing a joint venture as they share a common strategic goal and they each meet the requirements of the other despite a substantial technological gap. Additionally, the dominance achieved by JV1F and their demand for exclusivity in the joint venture as well as the fact that the two parties are not essentially in a competition relationship further ensures the stability of the joint venture. For these reasons, the JV1 joint venture is considered as a stable IJV, which will function without suffering the instability issues that hinder the co-operation. Therefore, the data analysis results of JV1 is considered to be valid in understanding its innovation behavior (in terms of **F1-F3**).

The innovation environment (**F1**) of the joint venture, on the other hand, limits innovation to thrive internally because neither JV1F nor JV1L strategically focuses on innovation achievements from JV1. As a consequence, JV1 does not seem to focus on innovation activities. Even though there is some evidence that JV1F and JV1L collaboratively invest on the R&D centre, the R&D centre seem to focus on market research rather than other actual innovation activities.

With respect to the resource accessibility (**F2**), although the IJV benefits from the direct access to the contributed resources of the two parent companies, there is no evidence that the joint venture sources external resources. For this reason, JV1 seems to have followed a closed innovation paradigm. Moreover, the contributed resources are largely provided by JV1F for the purpose of operating the IJV rather than getting engaged in innovation activities. This not only limits innovation within the IJV, but is also a constraining factor for JV1L in developing its own technological and innovative capabilities beyond what it can learn from JV1F.

On the other hand, in the resource utilisation process (innovation process, concluded as **F3**), the transferred resources are indeed modified and adapted by JV1. Nevertheless, the results of the modification seem to be the incremental changes to the existing products and technology of JV1F. As suggested by the evidences, there is clearly a technological gap between JV1F and JV1L. Due to the technological gap, JV1L's contribution of resources mainly represents the local knowledge, which explains the incremental innovation results. Despite this, there is some clear evidence of mutual learning and the capabilities of involved firms have been improved consequently.

6.5. IJV Case 2: JV2

The themes and codes to be used in this section were concluded by the comparison between current literature and the case of ICM. The data analysis of JV2 and JV3 will follow the same pattern as with the case of IJV1.

6.5.1. Data Analysis Part 1: Stability of the IJV

The evidence collected from the interviews suggests that the joint venture is operating with good stability. Yet, there does not seem to be a great suitability of the involved parties as there exists a substantial gap in the capability of the two parties. It seems that JV2F used the joint venture partnership as a means of fully entering the China market. The evidences show that JV2F does not regard JV2L as an optimum joint venture partner while JV2F itself is seen as an ideal joint venture partner by JV2L due to its superior technological capability. Despite this, the evidence suggests that

there have not been any major internal conflicts within the joint venture that obstruct the cooperation of JV2.

Suitability of the Involved Parties

As mentioned in the background of JV2, JV2F officially entered the China market in 2005 by starting local production of its models. This is relatively late compared to its European rivals. The motivation behind the establishment of the joint venture with JV2L is the sheer market size of China, as pointed out by JV2F1:

> *China is the largest car market in the world. We can see our cars are quite popular in China. So we took the opportunity to start local production and break the trade barrier to selling more JV2F cars. Also, local knowledge is proven to be highly useful during the collaboration (JV1F1).*

Other than the market potential of China, interviewee JV2F1 recognised the value of local resources. Nevertheless, interviewee JV2F2 regarded the establishment of the joint venture as a reaction to the pressure of the local government:

> *The joint venture is more of JV2F' compromise to the Chinese government. The cost of production under a joint venture partnership is actually greater (than JV2F going alone), especially in the early stage. The joint venture company brought some unnecessary procedures (JV2F2).*

Interviewee JV2F2 also explained that the reason for higher costs is that under a joint venture partnership, JV2F is obliged to spend extra resources to teach the local partner how to produce cars, including the standardised production procedure, the necessary technology and management knowledge. Yet, as required by the government, JV2F was left with no other option but to conduct a joint venture like other international car makers. JV2F realised this and initially planned to reduce this cost by doing the joint venture with a local company with better capability. The Chinese government influenced JV2F's plan, as JV2F3 noted:

> *JV2F prefers to do the joint venture with Company A or Company B (local automotive firms, company name hidden for ethical reasons) because they have better capability. The leaders (in government) have their plans of*

industrial allocation to ensure the balance of the economy of each region in China. The government interfered and JV2F as a latecomer, is allocated the in middle north region (JV2F2).

It seems that from the perspective of JV2F, a joint venture deal is merely the key to opening the China market, and partnering with JV2L seems to be the choice of the local government rather than JV2F. In fact, the requirement of the government that any international car maker has to have a local partner is designed to offer the local car makers the opportunity to learn every aspect of the advanced foreign car makers' technologies and management techniques. These are, in fact, exactly what is expected by JV2L, as the interviewee JV2L2 stated:

The number of products, the key technology and the management capability are the key to enhance our competitiveness. The collaboration with JV2F can allow us an opportunity to improve our own technology and production capability (JV2L2).

Interviewee JV2L1 further explained how they were looking to improve themselves:

Our company (JV2L) started by making commercial vehicles such as trucks and coaches. We didn't have our own passenger cars (in production) before. The passenger cars need some core technology to develop, such as the chassis, engine and transmission. Improving our overall technology (capability) is a key factor of our business strategy. We can learn these things from JV2F (JV2L1).

As commented on by the two interviewees, JV2L takes JV2F as an ideal joint venture partner due to their substantial technology capability. It should be mentioned that JV2L's first joint venture partnership started in 2002 with another automotive MNC which makes economy cars. The partnership has given JV2L the opportunity to improve its capability already, yet JV2L looked to further improve itself by partnering with another car maker with advanced technology. Considering the joint venture between JV2F and JV2L was established in 2005, when most of the major automotive MNCs had started local production, JV2F seems to be the only choice that met their standard for technological capability. Therefore, as a conclusion, the suitability of the two parties can be seen from one side: JV2F's preferable choice of local partner is

not JV2L despite it being the best IJV partner for JV2L.

Stability/Instability Factors

Although the suitability of the partners is not optimal, there is evidence that both parties are operating the IJV with relatively good stability. First of all, the evidence suggests that there is not any inter-partner competition due to the gap in technological capability and the different market focus, as pointed out by interviewee JV2F2:

> *There is no risk (of transferring technology) at all because JV2L is not capable of replicating JV2F technology. JV2L and JV2F are not at the same level and they are not competing with each other (JV2F2).*

Similarly, the interviewee JV2L2 commented:

> *Our technology of making passenger cars is still far behind European and American car makers. We are looking to close the technological gap through learning from them, rather than competing with them (JV2L2).*

Secondly, there is also evidence that both parties utilise each other's resources to fully operate the joint venture company, as commented by JV2L2:

> *The joint venture company is mainly about collaboration between the two parties. There is also responsibilities. We are both using our specialty in order to achieve our common strategic goal (JV2L2).*

Further to this statement, interviewee JV2L3 commented on the specialty of both parties:

> *The basic collaboration principle (of the joint venture company) is that JV2F brings the necessary technology for production and we provide the local support. Each party contributes what is needed to operate the joint venture (JV2L3).*

On the other hand, interviewee JV2F2 expressed a similar idea in a different way:

> *As JV2F is engaged in this joint venture, they will need to provide relevant resources to show their commitment in order to win (the Chinese)*

government's support. Such as their contribution of the technology, production knowledge and capital (JV2F2).

As discussed in a previous part of this section, JV2F's choice of conducting the joint venture with JV2L was largely influenced by the government. Nonetheless, it is understandable that JV2F expects to maximise its return on their investment of resources. The actual contribution of resources of the two parties will be discussed in the next section. In addition to the resources contributed by JV2F, JV2F is also making good use of local resources, as noted by JV2F3:

The local knowledge is valuable to JV2F. JV2F makes cars in a European way. Without some local experience and knowledge, JV2F wouldn't have produced some cars that suit the taste of local customers. Such as lengthened cars with more space in the backseats (JV2F3).

According to the interviewees from both sides of the joint venture, it is operating on the basis of complementary resources that is not available to the other without the joint venture partnership. This makes the JV2 joint venture a *Classic Joint Venture* as classified by Beamish (2008), as both parties only access the resources of each other to operate the joint venture. There is evidence to show that JV2L and JV2F are both involved in the decision-making process, as noted by JV2L1 and JV2F3:

Both parties hold half of the share of the joint venture. Chinese party and foreign party take part in the operation of the joint venture company, including production, management and marketing (JV2F3).

We have been participating in all aspects of the company operation, and provide as much help as we can (JV2L1).

By stating 'provide as much help as we can', the interviewee seems to suggest that the contribution of JV2L is in some area limited. Similarly, interviewee JV2L2 commented:

A joint venture company means collaboration. JV2 is mainly about co-operation but there is an emphasis (on responsibilities) (JV1L2).

Therefore, the JV2 seem to follow the *shared-but-split* control model proposed by Li

et al. (2011), meaning both parties take part in the management and control of the joint venture company, yet there are different focus areas according to their specialties. This type of joint venture control, according to Li et al. (2011), tends to be stable as both parties can feel their control over the company as a whole while the involvement in the control of the company does not hinder the performance of the joint venture company.

Despite the evidence that suggests the stability of the joint venture, there is also evidence of internal conflicts, as stated by JV2F2:

> *It (the conflict) is about the balance between the benefit of the joint venture company and JV2F itself. The objective of JV2F is to sell more cars and the locally made cars are just part of it (JV2F2).*

Interviewee JV1F3 further explained:

> *Locally made JV2F cars and European-made JV2F cars use different distribution channels. These two companies (JV2 and JV2F European) both aim to outsell the other and compete with each other, such as the Model W and Model Y (Locally made JV2F models, model name hidden for ethical reasons) and the Model W (European imported car model, similar market position to locally made models, model name hidden for ethical reasons) cars. This has brought a lot of trouble (JV2F3).*

In fact, there are in total 15 JV2F models in the China market, and only four of them are locally made. The performance of the joint venture company only represents part of the benefit that JV2F can get from China. Despite this, the interviews on the Chinese side did not reveal any evidence that JV2L considers this as a major issue. Perhaps from JV2L's point of view, it is taken as a conflict that is external to the cooperation of the joint venture because the profit that was made from the imported models does not concern their benefit directly. Additionally, JV2L benefits from the direct support of the local government and therefore does not concern that JV2F may not meet its responsibility as a joint venture partner, as pointed out by interviewee IIE2:

> *If JV2F wants to do business in China, it has to consider the benefit of JV2L.*

Otherwise, the government will not allow them to make easy money from local consumers (IIE2).

It seems that the local Chinese government has been influencing the joint venture company from the beginning to the present. Other than the conflict that is mentioned by the interviewees from the JV2F side, there is no more evidence that suggests internal conflicts within the joint venture company.

As a conclusion to this section, the evidence from the interview suggests that the joint venture is operating with good stability as it is considered to be a *classic joint venture,* and it seems to employ a *shared-but-split control* mechanism due to its complementary strength. There is evidence of some internal conflict, yet it seems that neither JV2L nor JV2F takes it as major issue, and none of the interviewees take this as obstacle factors to the IJV cooperation.

6.5.2. Data Analysis Part 2: Innovation Environment

The evidence collected from the interviews does not seem to suggest that the internal environment in the joint venture is friendly to innovation. This is because only JV2L takes innovation enhancement as a strategic focus and, consequently, commits resources to the innovation activities. JV2F mostly takes the joint venture company as a means to start local production and expand its business in China and is, therefore, not motivated to get engaged in the innovation activities.

Strategic Focus

The interview revealed evidence that JV2L takes innovation as what it expects from the joint venture, as interviewee JV2L1 pointed out:

Technological development is our strategic focus. We can see the competitiveness and profit brought by the technology, especially after we established the joint venture with JV2F. Our country (the government) has given us relevant support in order for us to develop our indigenous innovation capability. The joint venture provides us the opportunity to learn from JV2F and develop ourselves (JV2L1).

As clearly stated by the interviewee, JV2L takes innovation capability enhancement

as one of its strategic focuses. On the other hand, the JV2F side of the joint venture does not seem to be highly motivated to get engaged in technological innovation activities, as pointed out by JV2F2 and JV2F3:

> *The core technology of JV2F is developed in Europe, not in China. It (the joint venture company) is just an assembly line, not a complete automotive firm. The local R&D capability does not influence the performance of the joint venture to a large extent. JV2F's investment in local R&D is more of a reaction towards the requirement of the Chinese government (JV2F2).*

> *I think it is not (that innovation is the strategic focus of the joint venture company). JV2F aimed to open the door of the China market, and this is why the joint venture company is founded. The technology of JV2F is already very good. It will not get too much better with the operation of the joint venture company (JV2F3).*

Therefore, the evidence suggests that only the Chinese party takes innovation as the strategic focus of the joint venture company.

Resource Commitment

As JV2L takes the innovation capability enhancement as one of its strategic focuses, it is motivated to get engaged in the innovation activities, as pointed out by JV2L1:

> *We have spent a large amount of resources on technology development over the years. For example, we spent several hundreds of million RMB (Chinese currency) to establish an R&D centre (JV2L1).*

It seems that interviewee JV2L1 takes the collaborative R&D centre as a means of improving technology capability by doing technological R&D. Regardless, hundreds of millions of Yuan represent a substantial capital commitment. It is also noted that JV2L recognises the cost of innovation activities and takes the investment in R&D as a long-term strategy, as noted by JV2L2:

> *Technological innovation tests the overall capacity of a firm. Sometimes innovation can fail, which will not bring any profit. But, in the long run, innovation capacity is essential to the growth of a firm. I can say (we have*

made) a large investment and (we have set) a fast pace of improvement (JV2L2).

Yet, the R&D centre that is mentioned by JV2L1 is viewed in a different way, as JV2F2 noted:

Indeed, some R&D is done in the JV2F R&D centre, but they (the people who work for the R&D centre) are responsible for the understanding of local consumer behaviour and local customer tastes, not the research of cutting-edge technology. For example, they calculate how much money is to be spent to spec the car to make it very attractive (JV2F2).

The research on local consumer behaviour does not seem to be what is expected by JV2L as JV2L aims to enhance its technological capability. Indeed, when interviewee JV2L3 was asked about the current innovation achievements of the IJV, the interviewee claimed:

Mostly about the modification of body design and some minor adjustment to the cars to better suit the Chinese market (JV2L3).

The innovation achievements that are mentioned by JV2L2 barely represent *incremental innovation* achievements as they are only minor changes that were made to existing products. JV2L3's statement seems to support JV2F2's argument that the R&D centre's responsibility is to research local consumers' behaviour.

Other than the resources spent on the R&D centre, there is also evidence that JV2F commits resources to the training of local talent regardless of their motivation, as commented by JV2L2:

JV2F provides us with technological and managerial support, according to what we are not good at. They also provide us with training, especially our engineers. There is actually an MBA course that is provided by JV2F in order to train our management (JV2L2).

This is confirmed by interviewee JV2F2:

The training that JV2F provides to JV2L includes the production procedure, management team building and most importantly the technology of JV2F

(JV2F2).

It was discussed before that JV2F was forced by the government to conduct a joint venture partnership with JV2L and merely took it as a necessary agreement to ensure the success of their business in China. Therefore, JV2F does not take innovation achievements as their major expectation from the joint venture company. Furthermore, JV2F seems to aim to control the cost of the joint venture operation by spending the minimum resources to maintain a good relationship with JV2L and, more importantly, the local government. Also, as some resources need to be spent in order to achieve this, JV2F's reaction seems to be to maximise the benefits, which perhaps explains why the R&D centre is mostly doing research of local consumer behaviour.

On the other hand, the strategic focus on innovation enhancement is, as discussed before, one of the main motivations of collaborating with JV2F. The resources that are committed by JV2L seem to be truly aimed at improving their technological capability rather than a reaction to the requirement of the government. Yet, the strategic focus on innovation of JV2L only does not seem to lead to the strategic focus of JV2. As a consequence, JV2L does not seem to be have achieved substantial innovation results without real support from JV2F. As a conclusion, the innovation environment does not support the innovation outcomes in thriving internally because there is only one party that is truly motivated and committed.

6.5.3. Data Analysis Part 3: Resource Accessibility

The previous section of the data analysis revealed some common strategic goals as well as the parent companies' divergent expectations of the joint venture companies. This can influence the actual contribution of resources. The table below (Table 6.6) summarises the resources that were believed by the interviewees to be important to the IJV operation.

Table 6.7: Contributed Resources - JV2

	JV2F1	JV2F2	JV2F3	JV2L1	JV2L2	JV2L3
Local Resources				Land & Plant		
	Local	Local	Local	Local	Local	

	Knowledge	Knowledge	Knowledge	Knowledge	Knowledge	
		Local Talent		Local Talent	Local Talent	
	Political Support			Political Support		Political Support
Common Resources	Capital	Capital	Capital	Capital	Capital	Capital
Foreign Resources	Production Knowledge			Production Knowledge	Production Knowledge	
	Technology	Technology	Technology	Technology	Technology	Technology
	Mgmt Knowledge					Mgmt Knowledge
				Established Product		

The elements in the table above are summarised from the key points given by the interviewees and categorized. For example, standardised production procedure and production techniques are categorised as Production Knowledge; local marketing knowledge and culture knowledge are categorized as Local Knowledge.

The resources concluded from the table above cover the necessary resources to operate the joint venture company. These resources are what both parties are actually contributing to the joint venture company, as confirmed by interviewees JV2L2 and JV2F3

> *JV2L have contributed a lot of resources, including the land, local workforce and a large amount of capital injection (JV2L2); JV2F brings the necessary resources to China, such as their technology and production and management experience (JV2F3).*

There is also evidence that both parties are looking for the capability that was not accessible to them without the joint venture partnership. For example, interviewee JV2L1 takes the technology and well-developed products as their expectation:

> *Technology is prior, product is secondary. Good technology and good product can bring the joint venture company good market competitiveness (JV2L1).*

On the other hand, interviewee JV2F2 takes local knowledge as an important resource which is inaccessible to them.

> *Local talents (is an important resource), a local team which is capable of both*

local knowledge and international knowledge. JV2F, as a European company, do not fully understand the local business mode and the culture of China. Therefore, a good local team is essential for its success (JV2F2).

Interviewee JV2F1 also recognised that JV2L was capable of gaining support from the government, as the interviewee noted:

JV2L has earned us political support from both the local and central government of China, which is not available to JV2F (JV2F1).

What both JV2F and JV2L expect from their joint venture partner seems to be achieved during the operation of the joint venture. At this point, it seems that both parties have complementary strength. In fact, the complementarity of resources of the involved parties is recognised by both parties, as noted by JV2L1:

The resource complementarity is certainly important. We both need each other and this is the reason for the existence of the joint venture (JV2L1).

A similar statement is made by interviewee JV2F2:

Both JV2F and JV2L's capabilities are important for the joint venture. The resource of each party is not available to the other party without the joint venture partnership. Both parties have been utilising each other's resources and they are consuming each other's resources to better cooperate (JV2F2).

Other than the resources contributed to by the involved parties, there is no clear evidence that the joint venture benefits from other forms of external resources. JV2 seems to benefit from the resources of its parent companies only. It can be concluded that the joint venture company follows a *Closed Innovation* paradigm for it only benefits the resources of itself. In addition to this, the technology and knowledge, which are believed to be important resources for innovation, seem to come from JV2F only. Therefore, as a conclusion, the resources accessibility of the joint venture company does not seem to support the innovation activity within the joint venture.

6.5.4. Data Analysis Part 4: Resource Utilisation Process

Similar to the JV1 case, the previous section suggested that the resources that were made available to JV2 include the local resources such as local knowledge and the

connection with local government, as well as foreign resources such as technology, management and production knowledge. All of the interviewees were asked to generally describe the resource utilisation process for innovation purpose in the joint venture company. None of the interviewees provided a clear resources utilisation process like that of ICM. Other parts of the interview data provide some indication of how the joint venture company utilises its collaborative resources.

Resources Migration Stage

JV2's resource transfer process aims to optimally operate the joint venture company by making the locally made cars attractive in the China market. Interviewees JV2F1 and JV2F2 briefly described the transfer process of the foreign resources:

> *The technology and production line were transferred from European. In order to most efficiently use the resources, the transferred technology and production line were directly put on production (JV2F2).*
>
> *The board of director, both Chinese party and foreign party make ajoint decision on what are the necessary resources to be transferred from the parent company to the joint venture, in order to ensure the resources is utilised in optimal efficiency (JV2F1).*

The 'necessary resources' as well as the efficiency of resource utilisation mentioned by interviewee JV2F1 reflect on their motivation of making the most use of the resources. In addition to this, the decision on the resource transfer is suggested by the interviewee as a collaborative effort. These statements are confirmed by interviewee JV2L1:

> *The board of the joint venture collaboratively research and decide what local and foreign resources to allocate in the joint venture company. We aim to build good cars with Chinese characteristics (JV2L1).*

Interviewee JV2L1 seems to suggest that the resources that were brought to the IJV aim to build cars with characteristics that are attractive to Chinese consumers. It seems that both parties take the resources transferred to the joint venture company as for operating the joint venture, and there is no evidence to suggest that the

collaborative resources are used in the innovation activities.

Resource Adaptation Stage

The term 'Chinese characteristics' mentioned by interviewee JV2L1 represents the incremental modification that was made to the existing JV2F cars. In fact, the only evidence suggests incremental innovation in the joint venture was a result of knowledge modification after the resource transfer.

> *Technology-wise, there is not too much (modifications made to foreign technology) so far. We are still learning from JV2F. But together we have made some localised products (JV2L1).*

In the statement, interviewee JV2L1 denied the contribution of the joint venture partnership to the technological development of JV2F. Instead, the interviewee takes the localisation of JV2F cars as the results of the collaboration. The localisation mentioned by interviewee JV2L1 represents the process to make existing JV2F cars better suit the China market. A similar statement is made by interviewee JV2L3:

> *During the collaborative product R&D, the local researcher made JV2F realise that locally made cars are sold in China and therefore must meet the need of local consumer (JV2L3).*

That the R&D centre collaboratively established by both JV2L and JV2F focuses on analysing and researching the needs of local customers was discussed before. As a result, the existing JV2F cars models were modified to better suit the need of the local customer. The interviewee JV2F1 confirmed this by stating:

> *All of the JV2F cars were modified to better suit the taste of the Chinese customer. The modification mostly represents the minor changes that were made to existing JV2F cars (JV2F3).*

The interviewee JV2F3 clearly mentioned the 'minor changes', which represents the adjustment made to existing models. An example of the modification was given by interviewee JV2F2:

> *Such as the first local Model A (Model name excluded for confidentiality reason saloon car. Because JV2F did not think it's necessary to build it longer. Later*

JV2F made an adjustment to their products after they realised the significance of the local customer's preference (JV2F2).

As discussed before, the collaborative R&D centre focuses on the research of local consumer behaviour. Additionally, in the first few years of local production, the joint venture is producing the Model A (Model name removed for ethical reasons) vehicles with European standard. The consequence is that those locally made Model A cars are not popular because of the cost of production to meet the European standard and the fact that Chinese consumers prefer long wheel base cars with more space in the backseats, as suggested by interviewee JV2F2 and JV1L2. In the later operation of the joint venture company, changes were made to the locally produced cars. As a conclusion, the collaborative modification that was made by the joint venture represents the incremental innovation outcomes. Even though the incremental innovation results reflect the consideration of the need from the market, they do not involve a significant amount of technology development or introduction of new products.

Mutual Learning Effects

As discussed before, both parties have complementary strength and the resources of the involved parties complement each other. As a consequence of this, the operation of the joint venture created an opportunity for mutual learning between JV2L and JV2F. The mutual learning was, in fact,recognised by interviewee JV2F3:

JV2L's local knowledge and operation experience have given JV2F a lot of inspiration about how to do business in China. For example, the local distribution management, the dealership management. JV2F have also understood the local consumer behaviour during the collaboration. These are proven to be useful to the later business operation of JV2F (JV2F3).

Similarly, interviewee JV2L2 from the Chinese side also recognised the mutual learning phenomenon:

It's actually a mutual learning process. JV2F has learnt the local business

strategy from the Chinese party (JV2L). Likewise, Some production and management knowledge was initially the weakness of JV2L and they have to improve these with the collaboration with JV2F (JV2L2).

Though the mutual learning effect is recognised by the interviewee, there seems to be no evidence from the statement that the technology of JV2L was improved during the mutual learning process. A similar statement was made by JV2L1:

The standardised production procedure, the enterprise management and the marketing strategy. These are what we have learnt from JV2F. We have been learning little by little (JV2L1).

Again, the interviewee did not seem to take technology as what JV2L had learnt from JV2F. The result of learning seems to represent the business operation of a firm rather than the development of technology. The possible explanation for this is that JV2L seems to make use of the technology that JV2F transferred to them rather than learning and improving the R&D capability, as interviewee JV2L1 stated:

Some technologies of JV2F were transferred to us during the operation of the joint venture company. We have been using these technologies to build our independent car models (JV2L1).

It was discussed previously that the government requires automotive MNCs to transfer their technology to local partners. The evidence presented above seem to suggest that JV2L's reaction to this is to rely on the transferred technology rather than improve their technological capability through the collaboration with JV2F. Additionally, JV2F only takes the joint venture company as the necessary agreement to enter the market of China and, therefore, contribute resources that are merely enough to achieve this goal, which might limit the effects of the mutual learning process.

The evidence suggests that the resources contributed by both parties are to support the operation of the joint venture company, rather than getting engaged in the innovation activities. As for JV2F, the transfer of resources seems to aim to maximise the effects that JV2F can get from the market of China, whereas JV2L's contribution of resources seems to reflect the local resources rather than technological resources.

There is evidence to suggest that local knowledge played an important role in the modification of the existing product of JV2F, yet the modification represents incremental changes rather than technological improvement. During the collaboration, both parties were accessing the complementary capability of each partner, which, in turn, created an environment for mutual learning. Nevertheless, the evidence from the interview suggests that the result of the inter-partner learning process improves the production capability of JV2L and the local understanding of JV2F, which does not seem to have supported the innovation activities of the joint venture company.

6.5.5. Conclusion to the JV2 Case

With regards to the stability of the IJV (F4), the data analysis results show that JV2 has been operating with good stability, despite some minor internal conflicts between their parent companies outside the IJV operation. Such good stability is mainly demonstrated by the fact that JV2L and JV2F are not competing each other and there is a mutual benefit in conducting JV2. In fact, JV2 is also considered to be a 'classic joint venture', which further explained its stability. Therefore, the data analysis results of JV2 is considered to be valid in understanding its innovation behavior (in terms of **F1-F3**).

However, the innovation environment (**F1**) of JV2 does not seem to support its innovation activities. Before the establishment of the JV2 joint venture, JV2L already had one joint venture partnership with another international car maker. JV2L's motivation to start a joint venture with JV2F, other than making a profit, is to access the highly advanced technology of JV2F to improve their innovation capabilities. For this reason, there is evidence that revealed the strategic focus of JV2L on the potential innovation achievements in the IJVs. However, as JV2F does not strategically focus on delivering innovation via JV2, JV2 itself does not seem to inherit the strategic focus on innovation from JV2L. As a consequence, the investment of R&D centre of JV2 seems to be established as a reaction to Chinese government. Though the evidence suggests that there are some investments on the staff training, it does not seem to lead to the creation of innovation environment due to the lack of strategic focus.

Additionally, the joint venture strategy of JV2F is to get as much benefit as possible from the joint venture with JV2L. This includes the profit that JV2F can get from the joint venture company and the profit from the imported JV2F cars. Hence, JV2F seems to control the cost of the joint venture company by transferring resources that are merely enough to fully operate the joint venture company. JV2F's contribution of resources seems to help JV2L in building up its production knowledge, rather than a technological capability. Other than the limited resources contributed by JV2F, there is not evidence to suggest that JV2 is utilising external resources to innovate. Therefore, the resource accessibility (**F2**) does not seem to fully support the innovation activities of JV2.

Lastly, the limited resources transferred to JV2 have been modified and adapted by JV2, which results in some incremental innovation results. Other than the lack of strategic focus, the technological gap between JV2L and JV2F is the main reason for this. The incremental innovation results, representing the slight changes made to existing products only, does not by nature involve any improvement of existing technology or introduction of new technology, which does not fulfil the expectation of JV2L's focus on improving the technological capability.

6.6. IJV Case 3: JV3

The case of JV3 is one of the oldest IJV deals in China. It was established three decades ago and it still exists now. The case of JV3 has achieved better innovation performance than JV1 and JV2. The efforts from both parties have played important roles in this. The data analysis will be presented in this section in accordance to the themes and factors concluded before.

6.6.1. Data Analysis Part 1: Stability of the IJV

The evidence collected from the interviews suggests that the joint venture between JV3L and JV3F has been operated with great stability due to the suitability of the involved partners and the fact that the involved parties has not been suffering major instability issues. As with other IJV cases, the suitability of the involved partners will be first analysed before presenting the analysis of other factors that may affect the

stability of JV3.

Suitability of the Two Parties

The interview data revealed that JV3L actively sought external collaboration to enhance its independent capability, as pointed out by interviewee JV3L1:

> *Our first products were Model H (model name excluded for confidentiality reasons) saloon cars. It was based on a foreign model. Later, we experienced bottlenecks of development due to technology barriers. The joint venture company brought us the opportunity for learning and improving our capability (JV3L1).*

Further to this, the interviewee JV3L2 indicated why JV3F was considered particularly suitable:

> *JV3L initially tended to do the joint venture with JV3F because the products of JV3F suited the market of China. JV3F's cars are less expensive and relatively easier to make, such as Model A and B (model names excluded for confidentiality reasons). These are the popular car models in China (JV3L2).*

On the other hand, JV3F aimed to gain market share in China like all other automotive MNCs. As noted by interviewee JV3F1:

> *The market potential of China is substantial. It is an important part of JV3F's global strategy. JV3F aims to be the leader of the global automotive market and therefore cannot ignore the market of China (JV3F1).*

Other than this, another advantage of doing a joint venture deal in China was also recognised by the interviewee:

> *JV3F's joint venture company with JV3L was initially negotiated with the Chinese government. JV3F recognised the market potential of China and the low-cost local production. JV3L was open to external collaboration. JV3L was capable of making JV3F's cars in the early times. Hence, the joint venture company started (JV3F1).*

The above quotes indicate that JV3F recognised the intentions of the Chinese government. As discussed before, the policy of 'market for technology' was designed

to attract foreign investment in order to enhance the technological capability of local firms. Interviewee IIE2 comments that JV3F took the joint venture partnership as part of the strategy of entering China.

> *JV3F was one of the very first few companies that ever considered starting production in China. JV3F actually did it while other European and American companies were observing the Chinese market. They thought there was too much uncertainty in China. JV3F's strategy (to reduce the risk) was to find a joint venture partner because establishing a joint venture partnership with a large-sized local firm was the best option to JV3F(IIE2).*

The evidence from the previous two cases suggested that the JV1 and JV2 were mostly a reaction towards the local government's requirement rather than the foreign car maker's strategic intention. In the case of JV3, it seems that both JV3L and JV3F took each other as ideal joint venture partners. There is no evidence that any of the two parties were pushed to do the joint venture partnership by external forces.

Stability/Instability Factors of the IJV

The evidence suggests that the joint venture of JV3 is controlled jointly and both parties take responsibility in accordance with their relative advantage, as noted by interviewee JV3L1:

> *The strategic decisions of the senior management of the joint venture companies are made jointly. Other this, both local and foreign take their relative advantage to make a decision. For example, the European party is more technology capable and we are more capable of local knowledge (JV3L1).*

The interviewee mentioned the relative advantage, which referred to the complementary strength of each party. A similar statement was made by interviewee JV3L2:

> *Efficiency is the first priority. We will consider who is more convenient to deal with it (the issues of the company's operation) (JV3L2).*

Interviewee JV3F1 suggests that the important decision was made jointly by both parties:

In the key department, both local and foreign parties take the responsibility to make a joint decision, especially in the product R&D department (JV3L1).

It should be highlighted that the interviewee suggests that both parties were involved in the development of new product. As mentioned before, the joint venture produces a total of 21 car models, and five of them are specifically designed and produced in China by the joint venture company. JV3F aimed to achieve a high level of localisation and therefore took local knowledge as an important contribution The important implication is that it seems the joint venture is operated under a *'shared but split'* control model. Li et al (2011) suggests that this model is associated with stability in an international joint venture. In fact, none of the six interviews revealed any clear evidence of internal conflicts existing in the joint venture. The interviewee JV3L3 commented as follows:

There are no significant conflicts within the operation joint venture partnership. Two parties have been adapting and learning from each other in order to achieve a common objective. The collaboration between JV3F and JV3L has existed for more than X years (number removed to anonymise the data). They are more like one company (JV3L3).

The length of time of the joint venture history, according to the interviewee, reflects the stability of the joint venture. As one of the earliest IJVs in China, it is understandable that both parties needed to explore and develop together in order to start the local production of foreign models, which was never done before. Additionally, a long time of operational experience gave the involved parties substantial time to fully adapt to each other in the joint venture partnership. As a conclusion to this section, the joint venture between JV3L and JV3F has been operated with great stability.

6.6.2. Data Analysis Part 2: Innovation Environment

The evidence suggests that the internal environment of JV3 supports innovation to thrive. This is because the joint venture company takes innovation as one of its strategic focuses and hence it commits resources to achieve innovation results. The following sections will present the evidence collected from the interview.

Innovation as a Strategic Focus

First of all, JV3F takes China as an important contributor for implementing its global business operation, as stated by interviewee JV3F2:

> *These two joint ventures (JV3F established two IJV partnerships) in China is one the most important parts to ensure the success of the 2018 Strategy. JV3F aims to dramatically improve the capability of the local joint venture in order to improve the overall capability of itself (JV3F2).*

It should be mentioned that JV3F has two Chinese automotive firms as venture partners in China. The 2018 strategy of JV3F, referred to by the interviewee, represents the objective of JV3F aiming to achieve absolute leadership of global automotive industry in 2018. Based on this quote, it seems that JV3F regards the joint venture company as a part of its overall global business rather than merely a production line for JV3F's vehicles. Furthermore, JV3F takes the innovation achievement of the joint venture company itself as a focus of the business operation, as stated by interviewee JV3F1:

> *Innovation is one the focus of work in the joint venture company. People can see the evolution of localised JV3F cars. Some of them can only be seen in China. These are the reflection of the innovation achievements of JV3 (JV1F1).*

Though the evidence suggests that JV3F takes innovation as its strategic focus, the innovation achievements mentioned by the interviewee seems to represent *incremental innovation* and *architectural innovation* which do not involved the introduction to new technology or the improvement of existing technology. On the other hand, interviewee JV3L1 also takes innovation as one of its strategic focuses.

> *The significance of technological improvement and innovation is undoubted. It is the source of competitiveness in the market. It is true for both joint venture company and our company (JV3L1).*

As discussed in the company introduction part of this section, JV3 has developed five totally localised models under JV3F brand. All of these models are highly popular in the China market. Perhaps for this reason, both JV3F and JV3L takes innovation as an

important factor in the joint venture operation. Interviewee JV3L1 claimed that JV3L, after years of collaborative innovation, can compete with JV3F in the near future:

> *We are now capable of independent R&D based on what we learnt from JV3F. It would not take us long to be able to compete with JV3F as we have mastered the necessary R&D capabilities and competitiveness (JV3L1).*

Despite the confidence of the interviewee, there is not clear evidence to suggest that JV3L is currently capable of competing against JV3F with regard to technological capability. This is because JV3F is capable of delivering the most advanced technology in automotive industry. Instead, the evidence seem to suggest that JV3L is still relying on the transferred technology from JV3F. Despite this, the important implication of this statement is that, firstly, this statement confirms that both parties have been committed to R&D during the operation of the joint venture; secondly, the learning effect based on the collaborative R&D between JV3L and JV3F has truly improved the capability of JV3L.

Resource Commitment

Both JV3L and JV3F takes innovation as the important strategic focus of the operation of the joint venture company. As a consequence, there is evidence that both parties commit resources to the innovation activities. The interviewee JV3F2 commented on JV3F's commitment of resources:

> *JV3F invested a lot of resources in China to do the R&D, the R&D centre, for instance. A lot of innovation and R&D activities are done in it, such as the bestselling car model (model name excluded for confidentiality reasons) (JV3F2).*

On the other hand, there is also evidence that JV3L commits resources as well, as pointed out by interviewee JV3L1:

> *We have invested a large amount of resources in the innovation activities, including capital resources and human resources. Some commitment of resources in the early stage is necessary because innovation (enhancement) is a long-term process. It will ultimately bring us tangible profit. This is a virtuous*

circle. The profit of innovation can sustain the further innovation activities (JV3L1).

As discussed above, the joint venture company does take part in actual innovation activities as it develops new products that are specifically produced and sold in the Chinese market. The interviewee referred to the cost and benefit of innovation activities as a 'virtuous circle', which is similar to the suggestion of the innovation literature. In fact, JV3L has already benefited from the investment in R&D and innovation, which, perhaps, makes it more determined to further invest in the innovation activities. Similarly to the rest of the cases, there is also evidence to suggest that both JV3L and JV3F commit resources to staff training, as noted by interviewee JV3F2:

There is a 'twin-track' education system. The training covers all areas such as production, management and technology. The training is mostly done locally because JV3F has achieved a high level of localised development (JV3F2).

The twin track education system mentioned by the interviewee is similar to an internship training. The company starts the training before the employment and continues the training after. This is designed to ensure that the employee can make sufficient contribution to the operation of the joint venture company. Interviewee JV3L1 also commented on the training investment:

The employee training especially the training of employees in technology-related roles is also important. We pay to let them go abroad to for training. We also have the JV3 college (JV3L1).

The JV3 college that is mentioned by the interviewee was collaboratively established by JV3L and JV3F in order to ensure the employees of the joint venture company were educated in a systematic way.

As a conclusion to this part, the evidence suggests that the innovation environment supports the innovation activities due to the strategic focus on innovation and the commitment of the resources of both parties. There is also evidence from the existing JV3F products that the innovation investment has produced some results that benefit the joint venture company.

6.6.3. Data Analysis Part 3: Resource Accessibility

Interviewee JV3L3 commented before that JV3L and JV3F, under the joint venture partnership, function as one company due to their common strategic focus. The previous section, on the other hand, suggests that both parties strategically focus on innovation and commit resources in order to achieve innovation output. Therefore, both companies seem to contribute the necessary resources to the joint venture to operate the joint venture and improve its capabilities, as noted by interviewee JV3L1:

> *Currently, the competition is intense. Every (piece of) resource that can be utilised in the joint venture is important. These resources include the established product, technology, talent, financial resources and the connection with dealerships. It is actually a systematic competitiveness (that is required by the joint venture company) (JV3L1).*

The interviewee mentioned the term 'systematic competitiveness', which represents the overall capability of a firm. This is what the joint venture company aims to achieve. The important implication is that both parties make a full contribution to the joint venture company in order to optimally perform it. By this, both parties are actually contributing the resources based on their complementary strengths, as noted by JV3F2:

> *The Chinese party's local business operation knowledge and the foreign party's technology and business operation experience are both important to the joint venture company. Both parties have a complementary advantage. Each party has been helping the other and relying on each other (JV3F2).*

The interviewee seems to suggest that the resources contributed by the Chinese party are local knowledge while JV3F offers the necessary technology. Together, they are referred to by the interviewee as a complementary advantage. The importance of complementary strength is also seen by interviewee JV3L1:

> *The parent companies of a joint venture company should have resources that are not available to the other one. JV2L and JV3F are dependent on each other in terms of business operation (JV3L1).*

On the other hand, interviewee JV3L2 further commented on the contribution of resources of each party:

> *In the early years, the operation model (of the joint venture company) was that JV3F was responsible for bringing some technology and JV3L provides some necessary local resources such as plant, land and a workforce. Currently the Chinese party can contribute some technical support as well (JV3L2).*

The statement of JV3L2 seems to imply that the JV3L can provide some technological resources yet the majority of technological resources still come from JV3F. Nevertheless, both statements above seem to suggest that the resources that are available to JV2 are limited to the resources of its parent companies. Despite this, the significance of external resources seems to also be recognised by JV3L1:

> *Innovation needs external forces rather than internal capabilities. A firm needs to learn external technology rather exploring it by itself. It is very inefficient (JV3L1).*

The implication of this statement is that it seems JV3L recognises the significance of external resources. Yet, there is no evidence to suggest that the joint venture company is utilising the resources beyond the capabilities of the parent companies. The joint venture company is, in fact, utilising JV3F's technology to innovate and develop new products. Therefore, it can be concluded that the innovation activities in the JV3 joint venture are based on the resources of the involved parent company.

6.6.4. Data Analysis Part 4: Resource Utilisation Process

The previous part of this section suggests that both parties contribute resources to the joint venture according to their capability. The evidence that is going to be presented in this section suggests that the resources contributed by both parent companies are utilised collaboratively. There is also evidence to suggest that there is an established process of innovation process within the joint venture.

The Resources Migration Stage

First of all, there is evidence to suggest that the contribution of resources as based on the joint decision made by both parent companies, as noted by interviewee JV3F2:

Because the two parties have an equal share and a common strategic goal, the contribution of resources are based on the collaborative decision between both parties. It's mainly about what are the necessary resources to achieve the common strategic goals (JV3F2).

A similar statement was made by interviewee JV3L2:

The contributed resources are to offer the convenience of the operation of the joint venture. JV3L and JV3F make a joint decision on what the joint venture company needs and what we can provide (JV3L2).

It was mentioned before that both JV3L and JV3F take the innovation results as their strategic focus. Therefore, it is understandable that both parties use the transferred resources in the innovation activities, as stated by interviewee JV3L1.

Initially, the foreign technology and production line were used for production only. Now we combine foreign technology and local knowledge to innovate. The joint venture company generated some innovation results (JV3L1).

The quote seems to once again imply that JV3L's contribution of resources still mainly represents the local knowledge. Additionally, the innovation process of the absorbed resources seems to represent a combination of foreign technology and local resources to generate innovation output.

Resource Adaptation Stage

Similar to JV1 and JV2, the resources transferred to the joint venture company are modified according to the local environment, as noted by interviewee JV3L1:

All of the knowledge, technology and experience need to be adjusted according to the local conditions of China. Both the Chinese party and the foreign party collaboratively research and understand. To put it in simple terms, this (the resource modification process) is a 'transfer, understand, R&D' process (JV3L1).

The interviewee mentioned a 'transfer, understand, R&D' process of resource utilisation. The statement by interviewee JV3L1 was confirmed by interviewees JV3F2 and JV3F2:

Both the Chinese party and the European party take part in the modification process. The joint venture company first understands the local knowledge and then does collaborative R&D in order to make the existing products and technology for the local market. Both parties also introduced some new car models based on their understanding of the local environment (JV3F2).

Model A and Model B are a reflection of the R&D collaboration of JV3L and JV3F. These two models are the result of a combination of the local knowledge and foreign technology (JV3F3).

The utilisation process mentioned by interviewee JV3L1 seems to be the way that JV2 uses the absorbed resources to both operate the joint venture and innovate. There is evidence that the joint venture company combines foreign technology with local knowledge to modify the resources. The evidence seems to suggest that the modification of absorbed resources has generated some innovation output. Yet, the example of the innovation output represents new products with local features. Such as some car models that were specifically designed and produced in China, which is classified as *architectural innovation*. Such architectural innovation results also implies that JV3 take action to analyse the need of local consumer. In fact, model A mentioned above represents a collection of existing technology of JV3F. The model is extremely popular in the market of China as it precisely delivered what the local consumers in China expect from a car.

Mutual Learning Effects

The resource flow inside the joint venture company was summarised by interviewee JV3L1 as 'transfer, understand, R&D'. Both parties' involvement in this process has created the opportunity for mutual learning. This was recognised by interviewee JV3F2:

JV3L's technological capability has been improving gradually since the collaboration. JV3L has learnt the technology know-how, production and management knowledge. JV3F has also learnt from the joint venture company operation in China. It's a mutual learning and improvement process (JV3F2).

A similar statement was made by JV3L2:

Both the Chinese party and the foreign party have learnt a lot though the collaboration. The process of making a car, from design to assembly, influences JV3L the most. JV3F learnt some local business knowledge (JV3L2).

The evidence suggests that there is indeed mutual learning happening in the joint venture company. The involvement of JV3L in the collaborative development of localised products reflects the learning results. The joint venture partnership has allowed JV3L the opportunity of learning from JV3F, as noted by interviewee JV3L1:

The Chinese party and the foreign party have a different systematic mechanism. We use the joint venture firm as a platform to achieve technological development. Ultimately, we expect to develop our own capability of car design and production (JV3L1).

The term 'systematic mechanism' mentioned by the interviewee represents the organisational structure and the business model of a company. As stated by the interviewee, one of the main motivations of JV3L is to fully learn from JV3F and improve their capabilities. Additionally, the statement above seems to also suggest that there is still a technological gap between JV3F and JV3L. In fact, it is understandable that JV3F, as a potential industrial leader in the future, should have a far superior technological capability than JV3L which is still learning to design and produce cars.

As a conclusion, there is evidence to suggest that the resources that were transferred to the joint venture company are used for innovation activities rather than only focusing on production. In the modification of the foreign resources, JV3L's local knowledge has played an important role, which ultimately results in the incremental innovation and architectural innovation results. It should be highlighted that these innovation results reflect the contribution of local resources. There is also evidence to suggest the mutual learning of both parties through the utilisation of common resources, and the capability of JV3L has indeed been improved, especially with regard to R&D capability.

6.6.5. Conclusion to the JV3 Case

The stability of JV3 (**F4**) is considered to be exceptionally good. JV3 has been in

existence for more than three decades. JV3F's strategy of conducting an international joint venture in China seems to be successful as most of the popular car models in China are under the brand of JV3F. JV3F's intention of conducting a joint venture in China was to balance the risk and the opportunity of expanding its business in China, rather than just meeting the requirements of the Chinese government. There is clear evidence to suggest that both JV3F and JV3L show a good degree and mutual trust and dependency, which are important enabler of IJV stability. After three decades of IJV operation, JV3F and JV3L seem to have fully adapted to each other despite the different organisational structure of the two companies. Therefore, like JV1 and JV2, the data analysis results of JV3 is considered to be valid in understanding its innovation behavior (in terms of **F1-F3**).

Nevertheless, unlike JV1 and JV2, the JV3 case has revealed a common strategic focus of both parent companies on the innovation achievements on IJVs. The evidence suggests that both JV3F and JV3L recognise the significance of innovation and have worked together to create an innovation environment (**F1**) that encourages and supports innovation to thrive internally. As a consequence, the IJV company seems to to inherit such strategic focus naturally and consequently commit resources in the actual innovation activities. This can explain its better innovation performance to a large extent.

Despite this, the evidence seem to suggest that the case of JV3 does not benefit from external resources via external collaboration. There are only some hints that the leadership of JV3 recognises the significance of external resources and aims to adopt the *Open Innovation* paradigm. Nevertheless, the innovation achievements, namely incremental innovation and architectural innovation results, would otherwise suggest that JV3 only benefit from the resources of its parent companies. Therefore, the resources accessibility (**F2**) of JV3 is still essentially following a *Closed Innovation* paradigm

The actual process of utilising the resources for innovation purpose (**F3**) is outlined by the interviewee a process with distinct stages of 'transfer, understand, R&D'. This seems to align with the model of the ICM case. As a result of this, the transferred resources are modified and adapted, which results in its incremental innovation and

architectural innovation results. There is clear evidence to suggest the mutual learning effects between JV3L and JV3F and JV3L's capability have been improving. Despite this, there is still a technological gap between JV3L and JV3F. As a consequence, JV3 only achieved innovation results that do not involve the improvement to existing technology or introduction to new technologies.

III Cross-Case Analysis

The previous sections on data analysis have presented the qualitative data results of each individual case. The cross-analysis is going to critically compare the similarities and differences between the three IJV cases first with the aim of drawing a conclusion of common phenomena in the automotive IJVs. In order to achieve this, a key factors analysis will be presented. Then, the results of the IJV cases will be compared against the combined results of both ICM and the literature suggestion in order to draw a conclusion on why the innovation outputs of the selected IJVs have been limited.

6.7. Key Factors Analysis

As discussed in the previous sections, the IJV cases have revealed a great deal of similarities and some differences in each individual case. The similarities can explain the limited innovation performance of the selected automotive IJVs in as well as the automotive IJVs in China as a whole. The differences, on the other hand, can explain the slightly varied innovation performances of the IJV cases. The research showed that all of the three IJV cases have good stability (**F4**), confirming indications of the literature review regarding the automotive IJVs in China. Since **F4** has been satisfied for all three IJV cases, this section will concentrate on discussing the similarities and differences in accordance to the key factors that influence the innovation performance (**F1-F3**).

6.7.1. Factor 1: Innovation Environment

It was concluded in the individual IJV data analysis part that the internal environment of JV2 and JV1 does not seem support innovation within the joint venture company while the evidence seems to suggest that the environment of JV3 seems to do due

to the strategic focus and resource commitment on innovation. This section will present and discuss this factor.

F1.1. Strategic Focus

The common motivation for the selected three IJV cases, perhaps along with most of the automotive IJVs in China, is the substantial market size of China. Other than focusing on delivering a good performance for the joint venture companies, the evidence collected from the interviews seem to suggest that innovation is not the strategic focus of JV1 or JV2. In the case of JV1, it seems that neither JV1F nor JV1L expects innovation results from the joint venture company. Hence, it is logically understandable that innovation is not the strategic focus of the JV1 case. In the case of JV2, there are clear evidences that JV2L expects to achieve innovation results, especially in terms of technological innovation. It is also made clear that JV2F did not take JV2L as an ideal joint venture partner. Instead, JV2F was forced by Chinese government to establish the IJV partnership with JV2L. Hence JV2F has not been willing to spend extra resources to engage in innovation activities. As a consequence of this, JV2 does not have the strategic focus on innovation neither. Instead, the competitiveness of JV1 and JV2 seems to mostly originated from the well-established product and technology from JV1F and JV2F despite some *incremental innovation* results.

Yet in the JV3 case, the evidence suggests that innovation at the *incremental* and *architectural* levels is what both parent companies expect to achieve in the joint venture company in order to better adapt their products to the China market. It is clearly suggested by the interviewees that both JV3L and JV3F take the innovation results achieved by the joint venture company as the sources of their competitiveness. As a consequence of the common strategic goal, JV3 inherit the strategic focus on delivering innovation outputs. Yet the interviewees seem to suggest that JV3 only focused on incremental and architectural innovation. Such innovation results do not seem to involve the improvement to existing technology or introduction of new technology. Despite this, the R&D centre delivered some

innovation result which increased the competitiveness of JV3, whereas the R&D centres of the other two IJV cases seem to exist only because they were mandated by the Chinese government.

F1.2: Resources Commitment

There is clear evidence that all of the three selected IJV cases commit resources to establish an R&D centre. Yet, the evidence seems to suggest the actual objective and function of these R&D centres are different. The interview data indicate that the collaborative R&D centre of JV2 aims to work out how to best sell the existing JV2F models by calculating what the best specification combination of a car is. The evidence also suggests that the JV2F car models were modified in the R&D centre to make them better suit the local environment. The R&D centre of JV1 works in a similar way as it focuses on what the necessary changes for JV1F car models are to make them more attractive in the Chinese market. The outcomes of the R&D investment of these two IJVs seems to reflect no more than *incremental innovation* results. There is no other evidence to suggest *architectural innovation* or *radical innovation* results especially in terms of technological improvement.

In contrast, based on the strategic focus, the R&D centre of JV3 aims to develop new products to make the firm more competitive due to the strategic focus on delivering architectural innovation. In fact, there are four car models that were developed in the JV3 R&D centre that are highly popular, as discussed in the IJV data analysis. The investment that was made on the collaborative R&D centre seems to result, therefore, in architectural innovation results rather than only incremental changes made to the existing models.

There is also clear evidence from the interview data that all of the three IJVs commit resources for employee training. The training programmes of all three IJVs cover, as stated by the interviewees, all areas of the business, including management, technology aspects and standardised production procedures. It is also the same for the three cases that the training includes a local training programme and an international training programme. Despite the similarity of the three cases, in this

respect, the evidence would suggest that the JV3 training programme is more comprehensive to some extent. This is reflected in the 'double-track' education system and the college collaboratively established by JV3L and JV3F. This possibly reflects the strategic focus of the IJV by the parent companies as JV3 focuses on developing new products rather than operating the IJV for production only. As a conclusion to the commitment of resources, the three cases have spent resources on R&D and employee training, which is believed to support the innovation environment to some extent.

As a conclusion to the innovation environment for all three cases, JV3's internal environment seems to be better for innovation activities than that of JV1 and JV2. There is clear evidence to suggest that JV3 takes the innovation results in the joint venture company as one of the strategic focuses. The remaining two cases of JV1 and JV2 do not seem to strategically focus on innovation, as suggested by the evidence. Additionally, although there are resources of all three IJV cases spent on both R&D and staff training, the aim of the spent resources are different and it seems only JV3 focuses on delivering an *architectural innovation* output with the invested resources.

6.7.2. Factor 2: Resource Accessibility

There is clear evidence to suggest that the parent companies of the studied IJV cases contribute resources to the IJVs. The resources include the local knowledge of the local Chinese parties and the product and technology from the automotive MNCs. The IJV cases are exposed to these resources. However, the evidence seems to also suggest that the selected IJV cases benefit from the resources of the involved parent companies only. There is no clear evidence to suggest that any of the three studied IJV cases source products and technology elsewhere beyond the capabilities of their parent companies, such as through external licensing agreements or collaborative R&D projects between the IJV company and a third party. The R&D and other innovation activities evident in the IJVs are largely conducted on the basis of the resources of the parent companies. JV1 and JV2's R&D activities aim to improve the competitiveness of JV1F cars by modifying them according to understanding of local

needs, which reflects the combination of local resources and foreign resources. Although the evidence suggests that the JV3 case is more involved in the actual product R&D, the joint venture company focuses on modifying the existing JV3F products and delivering new products on the basis of the combination of local knowledge from JV3L and basic technology from JV3F. In this respect, all of the three selected IJV cases rely wholly on foreign and local resources combined, which seems to follow a *Closed Innovation* paradigm.

Therefore, as a conclusion, the three automotive IJV cases benefit from the contributed resources of two parent companies and lead to innovation (which would not be available to one company working alone). Yet, these IJVs do not benefit from resources outside the capabilities of their parent companies.

6.7.3. Factor 3: Innovation Process

It was discussed before that the theoretical innovation process models cannot fully understand and predict the innovation results. Yet the conclusion from the current literature is that the actual innovation process plays an important role. Specifically, the comparison between ICM's innovation process and theoretical innovation process conclude that there is a process of utilising resources for innovation purposes. In addition, there is also an inter-partner learning process in the context of the joint venture partnerships as well. This section is going to cross-analyse the three cases according to these three factors

F3.1. Market Need and Technological Development as Drivers

The innovation process models, such as the initial linear models and Interactive Model of innovation, stressed the significance of market need and the basic technological development in the industry. These two aspects are recognised by the literature as drivers of innovation activities. This in confirmed in the ICM case as the company starts its innovation activities from both a basic science need and the need of the market.

The data analysis of the three selected IJVs revealed evidence to suggest that all of the three IJV cases take market need as the basis of their modification of existing products and technologies. The JV3 case also takes the need of the local market as

the basis for the development of new products, other than modifying existing ones only. The development of new products mainly reflects the market need because the newly developed products are developed on the basis of existing technology from JV3F in combination with the understanding of the local market. Additionally, this further confirmed that JV3 makes use of the resources from the parent companies only. There is no evidence to suggest that the JV1 and JV2 joint ventures take basic technology and product development as the basis of their innovation activities as they are simply modifying existing products.

F3.2: Resource Migration Stage

There are clear evidences to suggest that all of the three selected IJV cases have a process for understanding the acquired resources in the resource migration stage though they are rather different. In the JV1 case, it is perhaps a pure teaching-learning relationship between these two parties as the interview data clearly suggests that JV1F has been teaching JV1L how to make use of the transferred resources. The possible reason for this is that JV1L is incapable of using the technology of JV1F in an effective way, plus the fact that JV1L had no joint venture operation experience before as JV1F is the first and the only joint venture partner. Therefore, the way that the joint venture company consumes the acquired resources seems to follow the teaching process from JV1F and put the transferred resource into production. On the other hand, the JV2 case seems to largely focus on the function of the joint venture company and, therefore, the transferred resources are directly put to the use of local production. JV2L's previous experience of joint ventures with another automotive MNC may have enabled it to skip some of the learning needed to catch up to JV2F in this respect.

Yet, in the JV3 case, the transferred resources were used both in local production and the further product R&D process. The evidence collected from the interview data seems to suggest that the R&D process is a collaborative effort between the two parties. Yet, the statement by one of the interviewees of JV3L suggests that in the initial stages of the joint venture operation, JV3L had been relying on the learning of foreign technology for the basic operation of the joint venture. Yet, as the IJV company has been established longer than the other two and the actual gap of

technology is relatively smaller, JV3L has been able to catch up to the capability of JV3F and therefore has been able to contribute as a more equally capable partner. The result of this is that JV3L and JV3F have created a genuine collaboration that is starting to yield some *architectural innovation* results.

F3.3: Resource Adaptation Process

The data analysis has revealed evidence that all three IJV cases take action to adapt the acquired resources, including technology and products, according to local knowledge. There are some similar results of such modification efforts from the cases of JV1 and JV2. The results of the modification constitute some minor adjustment of the existing products in order for them to be better adapted to the local environment, which is seen as *incremental innovation* only. In contrast, in the JV3 case, the joint venture company has delivered some *architectural innovation* results as well due to the development of new products. The evidence shows that JV3 has actually achieved technology integration from the parent companies as these newly introduced products are the results of the re-combination of the learnt technology from JV3F and local knowledge. Therefore, in this stage, it seems that only JV3 has truly mastered the resources of the parent company as the development of new product reflects the understanding of the required resources and shows them to be using innovation for product development.

F3.4: Mutual Learning Effects

The data analysis revealed clear evidence of inter-partner learning effects in all three IJV cases. In general, the evidence shows that the major learning results of the three IJV cases are a standardised production procedure, the technology and the management system of the foreign parties, whereas local knowledge is what the foreign parties have learnt from the local parties. Specifically, JV1F has learnt a 'diversified management style', which represents the cross-cultural management technique according to the interview data. JV3F, on the other hand, has learnt the development of new product based on the utilisation of local knowledge as the four car models were specifically developed by the joint venture company to suit the China market. Despite what each party has actually learnt from its joint venture

companies, the implication of the mutual learning effect is that the capabilities of all six involved companies have been improved, which aligns with current IJV theory.

As a conclusion to the resource utilisation process, all of the three cases show great similarities. The local parties initially relied on learning from the foreign parties for the basic operation of the joint ventures. The utilisation process of the acquired resources reflects the combination of local knowledge and foreign technology to deliver more value to their products. Yet the differences show that the JV3 joint venture seems to have moved further than JV1 and JV2 as the resources are utilised for the purpose of both production and product R&D whereas the resources of both JV1 and JV2 are utilised to run the joint venture only. It is the same case with the modification of resources as JV3 has delivered new products and adjusted existing products while JV1 and JV2 only managed to deliver some *incremental innovation* results. However, there is no evidence of newly developed technology at the *radical* level occurring in the three IJV cases.

6.8. Parallel Comparison

It was discussed before that the case of ICM has shown a great deal of similarity to the theoretical suggestion of innovation literature. The comparison between the suggestion of ICM and the theoretical suggestion of current literature was presented in section 6.3 and a number of implemented themes and factors were concluded. These main themes and factors represent what effectively leads to a good innovation performance of a firm. Based on these themes and factors, Section 6.7 provides a cross-comparison analysis of the three studied IJVs. The similarities and differences were discussed in accordance to themes and factors. Table 6.8 provides an overview of the discussion presented in Section 6.7.

Table 6.8: Cross-case Comparison

Factors[1]		Description	JV1	JV2	JV3
F4	**F4.1**	Are the parent companies of the IJV suitable for each other	YES	YES	YES
	F4.2	Does the IJV suffer from major instability issue?	NO	NO	NO
F1	**F1.1**	Is innovation the (or one of the) strategic focus of the IJV?	NO	NO	LIMITED[2]
	F1.2	Does the IJV commit resources in the innovation activities?	NO	NO	LIMITED[2]
F2:	**N/A**	Does the IJV benefit from a wide range of external resources via external collaboration?	NO	NO	NO
F3:	**F3.1**	Are the innovation activities of IJVs driven by market need and technology development?	LIMITED[3]	LIMITED[3]	LIMITED[3]
	F3.2	Are the parent companies' complementary resource transferred and combined in the IJV?	YES	YES	YES
	F3.3	Does the IJV adapt and modify the acquired resource IJVs to generate innovation results?	LIMITED[3]	LIMITED[3]	LIMITED[3]
	F3.4	Is there any mutual learning effects that improve the capability of involved firms?	YES	YES	YES

Notes: [1]The factors are discussed in Section 6.7.1-6.7.3. A 'YES' in any column means there is clear evidence to suggest a yes for this factor whereas a 'NO' means there is no evidence at all that this factor has been achieved or there is clear evidence that this factor has not been achieved; [2] JV3 only focuses on delivering architectural innovation based on existing technology/components of JV3F, consequently, the IJV only commit relevant resources to achieve this goal; [3] The incremental innovation and architectural innovation achieved by the IJVs represent the modification of MNCs' technological based on understanding of local market, which is only driven by the market need rather than technological development.

As shown in the table, it is a common phenomena that the studied IJV cases are operating with good stability. The important condition of stability of IJV (**F4**) has therefore been satisfied for all three case study IJVs in this study. However, it seems that the automotive IJVs in China failed to achieve some of the essential factors as to effectively deliver innovation. This section will discuss the comparison between IJVs

and ICM in accordance to main themes (**F1-F3**) in order to define what the general innovation phenomena in automotive IJVs in China is.

F1: Environment of Innovation

Although both local and foreign parent companies have slightly different motivations for starting the joint ventures in China and, therefore, have different strategic expectations, the basic function of the automotive IJVs in China is to produce vehicles locally. This is the expectation that the Chinese government, the local car firms and the automotive MNCs have in common. The important implication is that under this condition, the basic responsibility of the joint venture companies is that they are expected to produce cars and generate profits in China for their parent companies.

Additionally, the competitiveness of the joint venture companies seems to originate in the products that are already well-developed outside of China and the operation of the joint venture in order to efficiently produce them. Therefore, the joint venture company senior management does not tend to strategically focus on the costly innovation activities. This might explain the fact that the R&D centre of the selected IJV cases focuses on delivering *incremental innovation* and in minor cases, *architectural innovation* outputs as these innovation activities generally cost fewer resources and will bring tangible profit in a relatively shorter time than technological innovation especially at radical level. Therefore, the internal environment of the automotive joint venture in China does not seem to largely support innovation activities.

In the ICM case, it does not benefit from the well-developed foreign products, unlike the joint venture companies. Instead, it has had to focus on building up its own competitiveness by developing products on the basis of its own technology. Therefore, ICM takes a number of actions to make sure it is fully engaged in innovation activities from top to bottom. ICM strategically focuses and commits resources on innovation activities. The result of this is an innovation-friendly environment that helps innovation to thrive internally.

F2: Resources Accessibility

The evidence would suggest that the automotive IJVs only benefit from the resources of the involved parent companies as there is no evidence to suggest any other source of resources in the innovation activities. The consequence is that these automotive IJVs are limited to utilising the resources that the parent companies transfer to the IJVs and, therefore, the innovation activities are entirely based on the transferred resources only.

In the ICM case, although it does not have a joint venture partnership as the IJV cases do, it uses a wide range of external resources, such as external R&D collaboration and purchasing, which supply the firm with substantially more and varied resource input than these automotive IJVs. ICM's innovation paradigm follows the *Outside-in Open Innovation* model suggested by Chesbrough (2006) as the resources it absorbs is not limited by a joint venture partnership and the innovation output is used by itself only. Though the efficiency of *Open Innovation* is generally greater than the *Closed Innovation* paradigm, both innovation models can lead to innovation output.

As a conclusion, the automotive IJV partnerships in China do not give the joint venture company a substantial input of resources to follow an *Open Innovation* paradigm and they instead have limited access to the resources and the capabilities of the parent companies, which is rather a *Closed Innovation* paradigm.

F3: Innovation process

The theoretical innovation process models, such as the initial linear models and interactive models, stress the significance of both market needs and basically science. There are taken as the driver of innovation activities by the literature. The case of ICM has shown similar results as ICM have been actively observing and analysing the trends of market needs and industry development. Yet in these three IJVs cases, it seems that they have been focusing only on the market needs. There is no evidence that they focus on the industrial development. As the result of technological gap, the IJVs are only able to deliver incremental innovation and in minor cases, architectural innovation outputs based on the understanding of the market needs.

The ICM case suggested that it has a well-established innovation process based on

its own R&D capability, which played an important role in its technology and innovation capability building. Even though the interview data did not give a comprehensive picture of the innovation process of the IJV companies, the evidence suggests that the innovation process mostly represents a teaching-learning-utilising process. The joint venture companies then combine the transferred resources to generate some innovation results at an incremental and architectural level. In addition, there is clear evidence that the capabilities of the involved parent companies are improved due to the mutual learning effects.

The basis of the IJVs' and ICM's process of innovation seems to be fairly similar yet the results are rather different. The evidence seems to suggest that ICM accesses resources according to its capabilities and technological focus, whereas the IJV resources provided by parent companies strictly allow the IJVs to fulfill their purposes. There are automotive IJVs such as JV1, where there exists a substantial gap in technological capability and, therefore, the innovation process has not been as effective as it could be. This is because the local partner does not seem to be able to fully learn from the foreign party and make its contribution. Instead, it can only modify the products on the basis of local knowledge, resulting in incremental innovations only. There are also cases such as JV3 where the technological gap is relatively smaller and, therefore, the local party better learns from the foreign party; and the joint venture company can, therefore, deliver better innovation output through the learning results.

As a conclusion to the parallel comparison, there are three main reasons for the limited innovation performance in automotive IJVs in China:

- ***A lack of strategic focus on innovation*** - It is a common phenomena that both parent companies strategically focus on innovation, especially in terms of technological innovation. Though automotive IJVs indeed invest in both R&D and staff training, such investment tends to fulfill the purpose of production and marketing. Therefore the environment itself does not fully support innovation. The ultimate consequence is that there is not a good internal environment for innovation to thrive.

• ***Limited resource accessibility*** - The studied IJVs only benefit from the limited resources contributed by the parent companies. There is not any evidence to suggest that the IJVs benefit from external resources beyond the capability of the parent companies. Therefore, the studied IJVs follow the closed innovation paradigm due to the limited resource input, which in turn limits the innovation performance.

• ***Mismatch of capabilities*** - the technological gap between Chinese automotive firms and automotive MNCs means that the transferred resources cannot be optimally utilised under the IJV partnership, which further limits the innovation performance. Though there is clear evidence to suggest that the capabilities of involved parties have been improved as a result of inter-organisational learning, the IJV partnership has not been able to effectively deliver innovation results.

The above three reasons for the limited innovation performance of the studied automotive IJVs are concluded from the data analysis. The detailed discussion of this will be presented in next chapter.

Chapter 7: Discussion

The interview data of ICM and three IJV cases were analysed and compared in the previous chapter. The data analysis results show that the ICM's innovation activities, including its innovation strategy and innovation model, well aligned with the theoretical suggestion of the innovation literature. This can explain its superior innovation performance. However, in sharp contrast with ICM, the IJV cases seem to have failed to achieve the good practice as suggested by both ICM and the current literature on innovation. Based on the comparison between ICM and IJV cases, this research provides some explanation for the limited innovation performance in IJVs.

As discussed previously, the theoretical basis of Chinese government's IJV-innovation strategy can be seen from some literature on IJVs. However, the data analysis results seem to suggest that the theoretical suggestions of the IJV literature do not fully reflect the reality of the situation. Taking this into consideration, this chapter will set the data analysis results in the current literature and further explore the effectiveness of IJVs as an innovation driver. Based on the results, this chapter will also outline the implications of the research findings to provide critiques and recommendations for the policy of the Chinese government.

7.1. Discussion on the Limited Innovation Performance

Innovation as a human and organisational behaviour has been researched ever since the Schumpeterian theories almost a century ago. Upon reviewing some well-established innovation literature, this research has concluded a series of factors as to understand the innovation behaviour (**F1–F3**, with the addition of **F4** in the context of IJVs). These factors are taken as the theoretical basis of this research. On the other hand, current literature considers an IJV partnership as an effective medium to drive innovation due to some features of IJVs. The theoretical suggestions of the IJV literature and innovation literature align with each other to some extent as discussed

before. Yet, the results of the data analysis seem to suggest that there is a misalignment between the real-life phenomena and the IJV literature. A comparison of the innovation literature, the IJV literature, and the data analysis results is summarised in Table 7.1.

Table 7.1: Comparison Between the Literature and Research Results

Ideal Scenario[1] **(Innovation Theories)**	**What is Suggested to Happen[2]** **(IJV Theories)**	**What Actually Happened[3]** **(Data Analysis Results)**
F1: Creating an environment for innovation to thrive internally, including the strategic focus and the commitment of resources (e.g., Katz, 2003; Estrin, 2009; Hamel and Prahalad, 1989).	IJV partnerships allow the involved parties to influence each other and benefit from the opportunity for collaborative R&D (e.g., Minin and Zhang, 2010; Xu, 2011; Wang et al., 2007).	1. The IJVs strategically focused on the production and the operation of the IJV instead of innovation. 2. The resources are committed to better market the IJVs' products.
F2: Accessing a wide range of external resources to supply innovation activities (e.g., Open Innovation; System Innovation, Networking Theory).	IJV partnerships allow the involved firm to access the technological resources of each other, which can result in innovation (e.g., Nam, 2011; Yan and Luo, 2011).	1. The IJVs do not benefit from external resources beyond the parent companies' capability. 2. The IJV's resources are chosen by the parent companies rather than being chosen freely.
F3: Having a well-established innovation process to innovate efficiently based on the accessible resources (e.g., the evolution of innovation process models (Rothwell, 1994; Nobelius, 2003)).	IJV partnerships allow the involved firm to combine their resources with that of the parent companies and generate new knowledge (Pak et al., 2015). Additionally, there is inter-partner learning regarding internal structure, processes around resource utilisation and improvement of the capability of involved firms consequently (Fu et al., 2011; Wu and Pangarkar, 2006).	1. The technological gap means the local partner cannot optimally utilise the acquired resources, and instead is reliant on the foreign parties. 2. The involved parties in the IJVs have learnt from each other and improved their individual capabilities as the consequence of complementary resources and inter-partner learning.

*Notes: Since the stability of IJV (**F4**) has been satisfied for all three IJVs, **F4** has been omitted from table 7.1 and the discussion in this chapter.*

As suggested by the table above, it seems that the logic proposed by the IJV theories basically aligns with that of the innovation theories. Yet, the results of the data analysis revealed some discrepancies. These discrepancies are a lack of strategic

focus on innovation, a lack of resource input in the innovation activities as well as the ineffectiveness of resource utilisation due to the technological gap between involved partners. These factors represent the explanation for the studied IJVs' limited innovation performance. The following sections will discuss these explanations separately.

7.1.1. A Lack of Strategic Focus on Innovation

The current literature suggests that the environment of innovation is important for the innovation activities within a firm. An environment that supports the innovation activities is generally referred to as the culture of innovation whereas an environment that obstructs innovation activities is referred to as the counter-culture of innovation. A culture of innovation in influenced by some key points, such as the strategic focus on innovation (**F1.1**) and commitment of resources (**F1.2**) as suggested by a number of literature (e.g., Hamel and Prahalad, 1989; Estrin, 2009; Fagerberg et al., 2006). The significance of the innovation environment is demonstrated by the case of ICM. As ICM does not rely on a joint venture partner for its innovation activities, it instead has to strategically focus on delivering innovation output to establish its competitiveness. In order to implement such a business strategy, ICM commits its organisational resources to its innovation activities and ultimately created a culture of innovation.

As discussed in Chapter 3, the current literature on IJVs suggest that an IJV partnership can promote collaborative R&D activities as a consequence of complementary resources. For this reason, the IJV partnership can be potentially beneficial for the environment of innovation. However, the complementary resources committed by the parent companies does not necessarily mean there should be a culture/counter-culture of innovation. By nature, IJVs are established to serve the strategic goals of the parent companies. Therefore, the expectations of the parent companies will have a great influence on whether innovation is to be a part of the strategic focus of the IJVs.

In considering the studied IJV cases, it is evident that JV1 does not have the strategic focus on innovation, as neither of the two parent companies intended for the IJV to

generate innovation. Furthermore, as demonstrated by the case of JV2, innovation is still not the strategic focus of an IJV when there is only one parent company (JV2L) that shows the intent on IJV-based innovation. Although automotive MNCs generally strive to achieve competitiveness through innovation activities, such strategic intent does not necessarily mean that they expect innovation from their IJVs. Consequently, the IJVs do not necessarily have the strategic focus on innovation and are instead reliant on the well-established products and technologies of the MNC partners, which further limits the motivation of the IJV to innovate.

Nevertheless, as demonstrated by the case of JV3, there can be cases where IJV-based innovation is the common intent of the parent companies in the context of automotive IJVs in China. In this case, innovation is one of the purposes that the IJV is meant to serve and therefore, it is motivated to innovate. As a consequence, the IJV tends to commit the accessible resources to engage in innovation activities to achieve the common expectation of the parent companies. However, it should also be highlighted that JV3's strategic focus on innovation is limited to generating new products based on existing technologies/components (*architectural innovation*). Neither of the parent companies of JV3 strategically focuses on delivering new technology or improving existing technology due to the technological gap. Instead, the innovation results achieved by JV3 are largely based on the recombination of existing technologies of JV3F. Hence, JV3 also essentially relies on the technologies of foreign MNC partner (JV3F) despite the common strategic focus on architectural innovation.

As a conclusion, rather than creating a culture of innovation, the studied automotive IJVs in China seem to have created the counter-culture of innovation, which is suggested by Goffin and Mitchell (2010). Such a counter-culture of innovation, which obstructs innovation activities in the IJVs, is primarily due to the lack of strategic focus on innovation. As demonstrated by the studied IJV cases, the IJV companies only have the strategic focus on innovation when the involved parent companies show a common strategic intent on innovation via IJV partnership.

7.1.2. Limited Resource Accessibility

Some well-established innovation theories, such as the *Open Innovation* theory, suggest that actively sourcing external resources can grant a firm a variety of resource inputs. Therefore, it increases the likelihood of generating innovation outputs. The results of the innovation activities of a firm can be more efficiently utilised within a system where several firms share the resources as input and the innovation results as output. This is exactly why some innovation theories suggest that a firm should actively access more collaborative resources to enhance its innovation capability. The ideal scenario is that a firm can access a wide range of external resources through acquisition or collaboration, which gives the firm the resources to engage in innovation activities. Such theoretical suggestion is well demonstrated by the case of ICM, as ICM benefits from a wide range of external resources, such as strategic alliance and licensing agreements.

The logic behind the suggestion that an IJV partnership drives innovation is similar. This is because an IJV represents a type of international collaboration between at least one local firm and one MNC. The IJVs are argued to benefit from the direct access to the resources of their parent companies, such as technology, managerial know-how and capital resources. An IJV is exposed to the combined resources of its parent companies and therefore, it can support innovation activities. The theoretical suggestions of the innovation literature and IJV literature align with each other with respect to the input of resources in the innovation activities. Yet, the results of this research seem to suggest that the real-life phenomena in IJVs are rather more complex.

The evidence collected in this research would suggest that the automotive IJV companies in China are indeed exposed to the complementary resources of both local and foreign parties as suggested in the literature. Nevertheless, as demonstrated by all three IJV cases, an IJV company does not necessarily benefit from all resources of the parent companies. This is especially true for the highly advanced technological resources from MNCs. The MNCs have been selective about the resources they contribute to their IJV company to fulfil their goals. As demonstrated by all three IJV cases, the automotive MNCs aim to contribute enough

resources only to ensure the function of the IJV's daily operation, which is their main strategic focus. Consequently, the joint venture company only benefits from limited resources from its parent companies, which limits the potential innovation performance of an IJV. On the other hand, it was discussed before that the unsound IP protection mechanism in China can limit the willingness of MNCs to share their resources in collaborative innovation activities. Yet, this does not seem to be the case with the studied IJVs. In fact, it is clearly stated by some interviewees that the transfer of MNCs' technologies does not pose any significant risk on their IP. This is mainly because the local automotive firms are hardly capable of imitating MNCs' highly advanced technology. Additionally, as part of the strict requirement of the government on IJV partnerships, MNCs are required to transfer some technologies to the local IJV partner at certain stages of IJV operation.

Other than the limited resources from parent companies, the automotive IJV partnerships in China also limit the accessibility to external resources beyond the capability of the parent firms. Due to the contractual nature of the IJV partnership, both parties expect each other to be fully devoted to the IJV company in order to ensure the success of the IJV. As demonstrated by the case of JV1, exclusiveness is clearly required by JV1F, which consequently constrains JV1L as well as JV1 to engage in other collaborations outside the IJV partnership. Additionally, all of the IJV cases essentially rely on the resources of the foreign parties under the contractual IJV partnership, which limits their motivation for sourcing external resources for innovation purpose. The lack of access to external resources further limits input of resources in the innovation activities, which in turn limits the innovation performance of IJVs.

At this point, this research found that even if there is a strategic focus on innovation, there are other constraints on the resource input that limit the innovation performance of the studied IJVs. This is because the IJV company can only access the selected resources from the parent companies; and the IJV is also constrained in its access to external resources. Therefore, the innovation activities are conducted on the basis of the limited resources of the two parent companies that leads to an inefficient *Closed Innovation* paradigm. In order for the IJVs to effectively innovate,

the IJV needs to have the direct access to the resources of its parent companies and external resources through external collaboration.

7.1.3. Mismatch of Capabilities

The innovation process models, such as the *Interactive Model* of innovation and the *Integrated Model* of innovation, suggest that innovation is a process of utilising resources to generate commercially valuable outcomes. Yet, the available theoretical framework cannot fully explain the actual process of converting resource input into innovation outcomes. In this respect, the IJV literature suggests that the complementary resources from the parent companies are combined and modified to generate innovation results. In this respect, all of the studied IJV cases have confirmed that there is clear evidence of such a process that converts the resources of parent companies into incremental innovation and architectural innovation results.

However, this research found that the resources of the parent companies cannot be optimally utilised by the automotive IJVs in China due to the mismatch of capabilities. As suggested by the literature on IJVs, the complementary resources from both parent companies are combined and collaboratively utilised in an IJV to generate innovation outputs. Yet, as demonstrated by all the three studied IJV cases, the inflow of highly advanced technological resources from MNCs is not effectively utilised by the IJV companies due to the lack of technological capability of local parent companies. The reality is that it takes the local parties a long time to learn and fully catch up with the technological capability of their foreign partners, which causes a reliance on the foreign parties and therefore, limits the effectiveness of the collaborative innovation process. In fact, the limited technological capability of the local automotive firms explains why the innovation outputs of the automotive IJVs are largely limited to making incremental improvements to the existing products of the foreign party and, in minor cases, architectural innovation results based on existing technologies/components.

As a conclusion, in the automotive IJVs in China, the technological gaps between local and foreign parent companies have limited the effectiveness of collaborative

innovation process under IJV partnership. In order for the IJV company to effectively utilise the complementary resources to innovate, the parent companies need to have matching capabilities.

7.2. Re-evaluating the Capacity of IJV to Support Innovation

China experienced the transformation from a planned economy to a western-style market-oriented economy after 1978. However, the central government of China still describes China as 'communism with Chinese character'. In terms of economy, this means China now has a western-style market-oriented economy; yet, the central government imposes a heavy control over the industries and markets (Goodall et al., 2004). This control of the government can be seen from the policies issued to across all the industries in China including the innovation strategies (Ernst, 2011; OECD, 2007). Specifically in the automotive industry, the control of the government reflects the 'market for technology' strategy that led to the strict requirement on IJVs. The government's requirement on IJVs reflects its intention that the enhancement of the indigenous innovation capacity in the automotive industry should be done via IJV partnerships. As a consequence of the influence of the government, both local firms and MNCs complied to such strategy in order to ensure their success in China.

Nevertheless, as discussed in previous sections, this research finds that automotive IJV partnerships in China have not been beneficial to innovation. Rather than an effective medium to drive innovation, the IJV partnerships, specifically in the automotive industry in China, seem to have had the following negative effects: created a counter-culture of innovation; resulted in a *Closed Innovation* paradigm; caused ineffective utilisation of technological resources due to the technological gap; ultimately limiting the potential innovation performance of an IJV company. As a consequence of these negative effects, the automotive IJVs cannot effectively deliver innovation results and ultimately contribute to the enhancement of innovation capacity in China.

As discussed previously, the theoretical suggestions of current IJV literature (regarding innovation through IJV partnership) align with the innovation literature to

some extent. This is especially the case with regard to the accessibility of resources (**F2)**, as an IJV is argued to be exposed to the direct access to the resources of both parent companies. However, this research found that the current literature on IJVs did not properly take into account the current innovation theories and, consequently, failed to fully explain the real-life phenomena. With the consideration of the theoretical suggestions of some well-established innovation literature, this research identified some factors **(F1–F3)** that explained the limited innovation performance in the automotive IJVs. Based on the discussion in Section 7.1, it seems that the theoretical suggestion on an IJV's capacity to drive innovation is based on a series of assumptions. Specifically, as demonstrated by the case studies, this research found that an IJV partnership can effectively drive innovation only if the following conditions are fulfilled:

1: Achieving innovation in the IJV is the common strategic intent of both parent companies. The significance of the strategic focus on innovation is recognised by both current literature and the case of ICM. However, as demonstrated by the studied IJV cases, innovation is the strategic focus of the IJV company only when both involved parent companies show intent on IJV-based innovation.

2: The IJV company is free to access the resources of its parent companies and, more importantly, free to access external resources beyond the capability of the parent company. The significance of resource input is well-researched by some innovation theories such as the *Open Innovation* theory.

3: The capabilities of the parent companies match each other, and the transferred resources of the parent companies are complementary, so that the complementary resources of the parent companies as well as the potential external resources can be effectively utilised in the IJV for innovation purposes.

The three points discussed above represent the underlying factors in IJV-based innovation. These factors are drawn from the comparison of the theoretical suggestion of current literature and the results of case studies. Reconsidering the features of IJV partnerships in accordance with these factors, this research found that there are some other essential factors that could indicate the capacity of IJVs to

drive/obstruct innovation, which have been overlooked. Rather than promoting innovation, this research argues that IJV should not be taken as an effective medium to drive innovation. This is due to a few reasons.

First, the common intent of parent companies on innovation is rarely ensured by the nature of the IJV partnership. In fact, the general motivations for forming an IJV partnership can include, from the perspective of the foreign party, gaining the fast access to a unfamiliar market with the support of the local partner, including local knowledge and expertise as well as local political support and, from the local party's perspective, accessing the advanced technology and well-established products/services. It seems that utilising complementary resources to generate innovation is not generally the fundamental reason why an IJV is formed. This is especially the case from the perspective of foreign firms that aim to enter a foreign market with their products/services. This is well demonstrated by all three studied IJVs, as the automotive MNCs take IJV partnership as a means to entering the market of China instead of generating innovation results. Therefore, it is reasonable to expect that innovation is not often the common intent of the parent companies of an IJV, especially considering the costly and uncertain nature of innovation. Rather, the innovation results that occured in the IJVs seem to mostly represent a by-product of the complementary resources and IJV operation. The consequence is that the IJV company does not generally have the strategic focus on innovation activities, which is essential to build up an innovation-friendly internal environment.

Second, the IJV partnership seems to constrain the resource accessibility of the IJV company. Contradictory to some IJV literature, the IJV partnerships does not necessarily mean that the IJV company can have direct access to all of the resources of its parent companies. This is especially the case with accessing the highly advanced technological resources, as an IJV is merely a subsidiary of its parent companies and is only established to serve its parent companies. Additionally, the parent companies can often have concerns over their IP. Hence, it is unlikely that the parent companies of an IJV are entirely willing to share the key technological resources that they use to sustain their own competitiveness. More importantly, the contractual nature of an IJV can often constrain the flexibility of IJVs to form other collaborations and acquire

external resources. In fact, the nature of the IJV partnership means that the joint venture company is expected to utilise the complementary resources of the parent companies to fulfil the strategic goals of the parent companies. Therefore, it is not generally the case that a joint venture company will substantially engage in external collaborations in order to adopt the effective *Open Innovation* paradigm. This is because if the resources of the involved parties are not believed to be enough to achieve the parent companies' goal(s), the joint venture company should not be established in the first place.

Last, the IJV partnership does not always mean that the involved parent companies have matching capabilities. Rather, IJVs are mostly established on the basis of complementary capabilities instead of matching capabilities. In fact, having complementary capabilities is regarded by current literature as one of the key factors to ensure the success of IJVs. As demonstrated by the studied IJV cases, the local parent companies' capabilities (including local knowledge and local political support) and MNCs' capabilities (advanced technology, production knowledge and well-established products) mostly represent what is needed by each party in an IJV. It seems that matching capability is not necessary to form an IJV though it plays an important role in collaborative innovation activities. Therefore, it is appropriate to expect that in general cases, the transferred resources do not always fully match the capability of the involved parties. The consequence is that the resources of one of the partners cannot effectively utilise the transferred resources from the other partner, which limits the effectiveness of collaborative innovation activities of the IJV.

At this point, it seems that the nature of the IJVs cannot generally guarantee an innovation-friendly environment (**F1**), a substantial amount of resource input (**F2**) as well as an effective innovation process (**F3**), which are argued to be important factors by current innovation literature. The current literature takes an IJV partnership as an effective means of exchanging resources of its parent companies and establishing a platform for inter-partner learning. Therefore, an IJV partnership is argued by current literature to be an effective medium for driving innovation. However, this research found that such theoretical suggestion is rather simplistic. Rather than promoting innovation, it seems that the nature of IJV partnership can more often limit the

potential innovation performance of the IJV company. This is well demonstrated by the studied IJV cases. It seems that as a medium of driving innovation, IJV's limitations generally overweigh its benefits. Thus, this research concludes that even though there can be rare scenarios where an IJV can effectively drive innovation, it is inadequate to generalise IJVs as drivers of innovation.

It was discussed previously that the theoretical basis of the government's IJV-innovation strategy can be seen in the *Multi-Stage Model of Knowledge Management* proposed by Pak et al. (2015). According to that model, the resources of the parent companies are combined and modified in an IJV company to generate new knowledge. The newly created knowledge will be harvested by the parent companies, which consequently improves their capabilities. The real-life examples support the theoretical arguments presented by the model as discussed in Section 4.2.

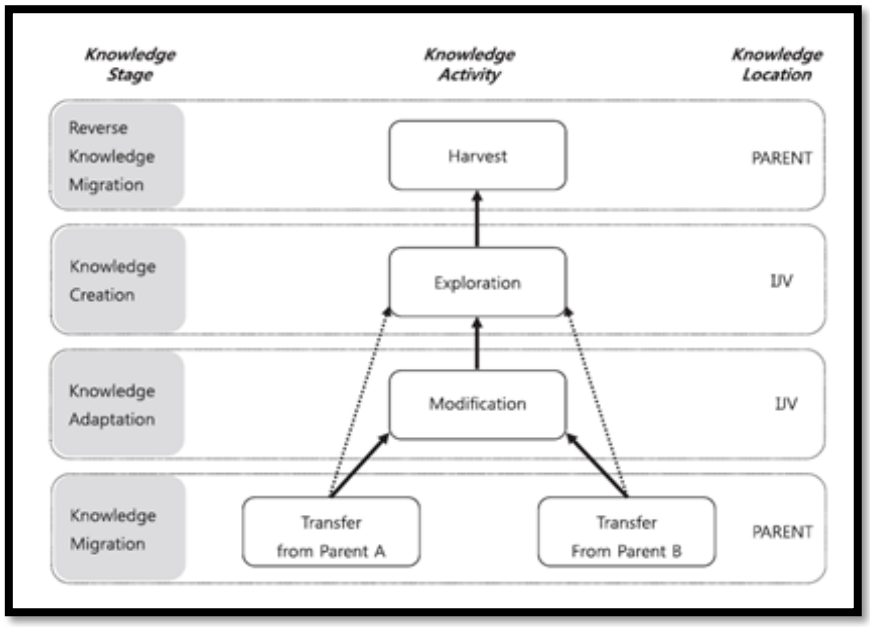


Figure 7.1: Multi-Stage Model of Knowledge Management. (Pak et al., 2015)

However, based on the case study results, this research found that the IJV partnerships should not be generalised as effective mediums to drive innovation due to the nature of the IJV partnerships. This means that there can often be fairly limited innovation results that lead to limited knowledge feedback effects.

Despite this, this research recognises the fact that there can be circumstances where

an IJV can effectively drive innovation and consequently provide optimal knowledge feedback effects to its parent companies. That is, if the parent companies of an IJV share a common strategic intent on IJV-based innovation, the IJV is free to access external resources; additionally, the parent companies have matching capabilities. Applying these underlying factors of IJV-based innovation in the model of Pak et al. (2015), this research proposes a new knowledge flow model as shown in Figure 7.2.

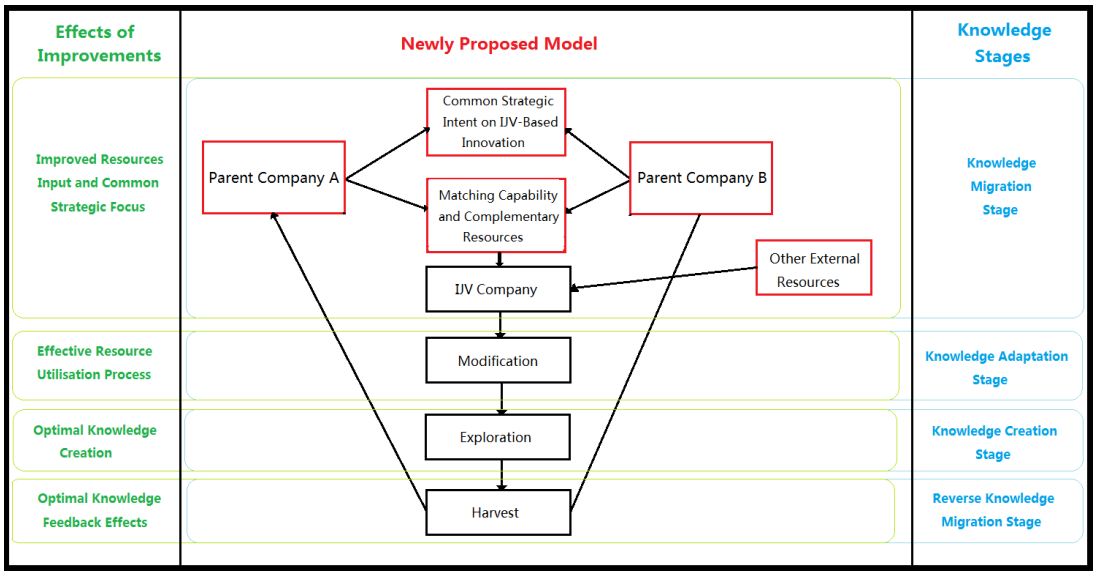


Figure 7.2: Modified Model of Optimal Knowledge Creation in IJVs

The main adjustments to this model are the additional consideration of the underlying factors of IJV-based innovation. This research found that the parent companies having a common strategic intent on IJV-based innovation, which means that their IJV company naturally has a strategic focus on innovation. This strategic focus on innovation can, in turn, lead to the commitment of resources and, ultimately, create an innovation-friendly environment. Furthermore, the access to external resources beyond the capabilities of the parent companies is also significant, as it can lead to the adoption of an *Open Innovation* paradigm, which is argued to be effective and efficient by the current literature. Last, the matching capabilities among the firms would mean that the resources acquired from both parent companies and external sources can be optimally utilised in the collaborative innovation process of an IJV.

This newly proposed model is based on the literature on both IJVs and innovation as

well as the findings of this research. It combines the ideal scenario where an IJV can effectively drive innovation with the original model of Pak et al (2015). This research found that by applying this newly revised model, the likelihood of generating innovation results in an IJV can be maximised and consequently, there will be an optimal reverse knowledge migration effect under an IJV partnership. Therefore, from a theoretical perspective, it is possible that IJV partnerships can effectively enhance the indigenous innovation capacity in China, though IJV partnerships should not be expected to be a good vehicle to drive innovation. In fact, the optimal reverse knowledge migration effects reflect what the central government truly expects from the IJV-innovation strategy. In light of the discussion in this section, the next section will discuss the policy implications of this research.

7.3. Policy Implications

The revised model of knowledge creation in the context of IJVs is provided in the previous section. The revised model represents the ideal scenario in which an IJV can effectively drive innovation and result in optimal feedback effects. In applying this newly devised model to maximise the IJV-innovation strategy, the central government of China should issue policies to encourage the collaboration between local automotive firms and automotive MNCs that are equally equipped and motivated to innovate collaboratively under the IJV partnerships. However, upon reviewing the real-life conditions, this research would argue that the newly devised model cannot be realistically applied in the automotive industry in China.

First, from the perspective of the innovation environment of the IJVs, it is not realistic to expect that both the local firms and MNCs have a common strategic intent on IJV-based innovation. This is because most of the automotive MNCs seem to merely take their joint venture partnership as an answer to the strict requirement of the Chinese government. The strict requirement on IJVs is not enough to motivate automotive MNCs to raise their R&D cost in a foreign country that cannot realistically generate substantial innovation results in order to greatly improve their competitiveness. Instead, MNCs tend to control the cost operation to comply with the government's

requirement. As a consequence, the innovation activities are largely based on the foreign parties' technologies and knowledge that is selected by the MNCs. This can explain why the innovation output of the automotive IJVs are limited to incremental changes to existing products and, in minor cases, the development of new products based on the recombination of existing technology.

Second, from the perspective of external resources, it is rather unlikely that the automotive IJVs in China will be motivated to utilise external resources to innovate. In fact, as demonstrated by the cases studied, gaining a market share and profit are the most evident common goals of both local firms and MNCs. In this sense, the local firms' capability (including local knowledge and local support) and MNCs' capability (including technological, operational and managerial knowledge and know-how) are complementary. Additionally, they are sufficient to achieve the common objective and utilising external resources does not seem to be necessary. More importantly, MNCs' advanced resources are the very reason why the Chinese government has been pushing the collaboration between local firms with MNCs. Hence, it is not realistic to expect that either the local firms or MNCs are motivated to utilise external resources to implement innovation activities as a by-product of an IJV operation.

Last, it is a common phenomenon that most Chinese automotive firms are not capable of a substantial amount of technology at the current stage while the automotive MNCs generally are capable of it. This means that it is almost certain that there is a substantial technological gap between the automotive IJVs in China and the MNCs. The local parties are not able to provide the necessary technological resources in the collaborative innovation activities with its foreign IJV partner. Instead, the resource contribution of local parties mainly consists of the local know-how, such as the local market knowledge and local business experience. The consequence is that Chinese car makers cannot efficiently utilise foreign technological resources and hence, they have been relying on the foreign technologies. The aim of the 'market for technology' strategy mainly aimed at improving the indigenous innovation and R&D capabilities via the collaboration with MNCs. Yet, such strategy seems to have caused a reliance on the resources of MNCs due to the technological gap between the local firms and MNCs.

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At this point, it seems that the newly developed model of optimal knowledge creation cannot be realistically applied in the automotive industry in China. This means that the automotive IJVs in China are unlikely to be beneficial for the enhancement of indigenous innovation. There has been a substantial gap between the innovation capabilities of the case of ICM and the automotive IJVs as well as their local parent companies. This research found that the explanation for this lies in the IJV partnership itself, which contradicts the theoretical suggestion and the belief of the Chinese government.

Whereas the local automotive firms harvested limited innovation results from the automotive IJV, the ICM case demonstrated that there is an alternative solution to the enhancement of indigenous innovation. ICM has been actively engaging in external collaboration. In such a way, the ICM has supplied its innovation activities with a wide range of resources and ultimately enhanced its innovation capacity. The experience of the ICM seems to perfectly align with the theoretical suggestion of some well-established innovation theories, such as *Open Innovation.* In fact, the effectiveness of *Open Innovation* paradigm is demonstrated by other industries in China where the progress of the indigenous innovation enhancement has been much more apparent.

Taking China's telecommunication industry as an example, it has benefited from establishing an innovation network where a number of local firms share their resources (Zhang et al, 2018). The involved firms have been making use of the resources and R&D capabilities of each other and the technological capabilities of each involved companies have been consequently improved (Zhang et al, 2018). Essentially, the multiple collaboration of the local firms created an innovation cluster as suggested by Porter (1990). The result of such an innovation cluster is that the involved firms within this system benefit from the *Open Innovation* paradigm and the innovation capacity of these firms are enhanced accordingly. Good examples include Huawei due to its wide-ranging involvement of innovation network and consequently, its superior innovation performance (Liu et al, 2018). In fact, rather similarly, Huawei's progress of innovation enhancement evidently outpaced Shanghai-Bell (one of the most significant IJV in China's telecommunication industry)

due to Huawei's Open Innovation paradigm (Qing and Keun, 2005; Kang, 2005), which echoes the findings of this research. Other industries in China that successfully benefit from the *Open Innovation* paradigm also include the information technology (IT) industry, which can be demonstrated by the case of both Baidu and Tencent, which are both known as world-class innovator (Forbes, 2018). The case of ICM, together with successful experience of other highly innovative Chinese firms, would demonstrate that the adoption of the *Open Innovation* paradigm is far more effective than the IJV-dependent approach.

However, despite the ineffectiveness of the IJV-innovation strategy, it must be recognised that the strict requirement on IJVs has rather effectively ensured the survival of local firms. Under the contractual IJV partnerships, the welfare of local firms and MNCs has been essentially bound together as the benefits that the MNCs can receive from China, which mostly come from their IJV companies that are jointly owned with local firms. This has effectively motivated the MNCs to ensure the success of their IJV companies, which also ensured the survival of local automotive firms to a large extent. Therefore, the requirement of IJV partnerships needs to persist till the local automotive firms can effectively compete automotive MNCs, otherwise the automotive local firms will face the competition from automotive MNCs which significantly threats their survival. Despite this, the requirement on IJVs does not seem to effectively motivate MNCs to contribute to indigenous innovation. This is mainly because the benefit that MNCs can get from the market of China does not seem to originate from the collaborative innovation results.

On the basis of the successful experiences of ICM as well as some other companies in other industry such as Huawei, this research recommends that the policy of the Chinese government should not entirely rely on the ineffective IJV-Innovation strategy. Instead, the government should now shift its focus and encourage local automotive firms to collaborate more widely to form a wider innovation network beyond their IJV partnerships. Research institutes such as universities and other R&D organisations are also good players of such innovation network as demonstrated by both ICM and Huawei. In addition, instead of the contractual partnerships in which the involved parties are largely limited and restricted by the terms and conditions,

the government should encourage a more loose form of collaboration, such as strategic alliances. This is because, as demonstrated by all IJV cases, the contractual IJV partnership demotivated the involved parties, especially MNCs to willingly contribute resources for innovation activities. Instead, MNCs only contribute resources which are barely enough to meet the contractual requirements.

In fact, with the influence of the government, such local innovation network should be effectively established with relative ease. As most of the local automotive firms as well as research institutes are state-owned, the policies and strategic objectives of the government have direct impacts on their strategic intent. This means that it is fairly likely that the local automotive firms will be motivated to possess the strategic focus on innovation and innovate collaboratively in an innovation network. In fact, JV2L and JV3L have both shown the strategic focus on innovation; still their strategic focus has not been enough to decide the strategic focus of their IJV companies.

As a conclusion to the above arguments, the effectiveness of the Chinese government's IJV-innovation strategy for the automotive industry has been limited due to the IJV partnerships themselves. This research found that in the context of the automotive industry of China, IJV partnerships are more constraining than supportive of innovation. Instead of a medium to enhance the indigenous innovation, the IJV partnership should be considered as a means of ensuring the survival of local firms. As demonstrated by the case of ICM, it is entirely possible and practical for a local automotive firm with limited capability to engage in an innovation network to substantially improve its technological capability and competitiveness. Hence, the policy of the Chinese government should encourage local firms to widely engage in innovation systems involving a few firms and other research institutes, rather than relying on IJV partnerships with foreign parties that are not motivated to contribute to the enhancement of indigenous innovation.

Chapter 8: Conclusion

8.1. Overview of the Research

In the last three decades, China has experienced remarkable progress in terms of economic growth. However, there is also concern on the low value-added oriented economy as it has imposed a significant limitation on the sustainability of China's economic development. This is particularly evident in the automotive industry in China as the Chinese automotive firms are far from being capable of competing against major automotive MNCs due to the lack of technological capability. Instead, the local automotive firms have been focusing on producing low-end cars based on the cost advantage, which is not a sustainable strategy. Actions have been taken by the Chinese government to enhance the technological capabilities and innovation of local firms in order to ultimately improve their competitiveness.

MNCs have played an important role in the Chinese government's policies as the government views collaboration with MNCs as a major way of improving the innovation capacity of Chinese automotive firms. The logic behind this is supported by empirical research as the current IJV literature suggests that the IJV partnership, as a typical form of international collaboration with MNCs, allows also the involved firms to access the complementary resources of each other and establish a platform of knowledge creation and inter-partner learning. Therefore, the IJV partnership is argued to be an effective vehicle to drive innovation. The innovation results achieved by IJVs can then be harvested by the parent companies, and this also helps improve their individual capabilities ultimately.

Real-world evidence suggests that the automotive IJVs in China have indeed delivered innovation results as predicted by literature. However, the innovation performances of the automotive IJVs in China have been rather limited. The innovation achievements of the automotive IJVs mainly include minor changes made to existing car models (*incremental innovation*), and in some minor cases, the

recombination of existing technology or components to develop new products (*architectural innovation*). There is no evidence that suggests the automotive IJVs have generated any innovation results that concern improving existing technology and introducing new technology, especially at a radical level. The incremental innovation and architectural innovation achieved by the IJVs result in limited knowledge feedback effects, which in turn limits the enhancement of the innovation capacity of local firms. This is not what was actually expected by the Chinese government as the technological capability of local firms is not significantly improved through the IJV partnerships. Consequently, local automotive firms' lack of technological capability, as the main issue with local automotive firms, is not addressed through the IJV partnerships. Hence, this research finds that factors seemed to be missing in the current theories on IJVs as the literature did not reflect and cannot fully explain the real-life phenomenon, especially in the context of the automotive industry in China.

This research aimed to explore the explanation for the limited innovation performance in the automotive IJVs in China. To achieve the research objective, a qualitative case study research approach with multi-case and polar-type case selection strategies was employed. The research focused on three representative Chinese automotive IJVs and one highly innovative Chinese automotive firm that does not have an IJV partnership. The primary data required to achieve the research objective was collected from a total of 26 interviews of carefully selected interview participants. The data collected from the interviews was analysed using qualitative data analysis techniques, comprising thematic analysis, coding and code mapping. The data analysis results for the independent automotive firm (ICM) were first compared against current innovation theories to devise a good practice framework in the automotive industry in China. The data of each IJV case was then analysed individually in accordance with this framework first, before a cross-case analysis of all three IJV cases was performed.

8.2. Contribution to Knowledge

The theoretical basis of this research was built upon some well-established innovation theories. Based on the review of literature on innovation, this research drew three main factors as to understand innovation behaviour. These factors are the environment of innovation (**F1**), the accessibility to resources (**F2**) and the process of innovation (**F3**) as well as the stability of IJV (**F4**) in the context of IJVs. The current literature on innovation argues that these factors influence a firm's innovation performance. Furthermore, the case study of ICM has also confirmed that these three factors are indeed what effectively contribute to its superior innovation performance. Upon reviewing the literature on IJV's capacity to drive innovation, it seemed that the theoretical suggestions of innovation literature and IJV literature align with each other to some extent.

However, this research suggests that the IJV partnerships have actually limited the innovation performance of the studied automotive IJVs in China. Considering the factors influencing the innovation (**F1–F4**), this research found three main explanations for the limited innovation performance of IJVs. First, this research found a lack of strategic focus on innovation activities. Due to the lack of strategic focus on innovation, automotive MNCs tend to be selective about the resources they contribute to their joint venture companies. The contributed resources are actually intended to fulfil the strategic goal of the parent companies. In the context of automotive IJVs, such a strategic goal is operating the local production of established foreign models rather than engaging in innovation activities. Therefore, only a limited amount of the MNCs' advanced technological resources have been accessible to the IJV company, thus, limiting the input of resources into any potential innovation activities.

On the other hand, the automotive IJV partnerships in China limit the potential opportunity for utilising external resources beyond the capabilities of the parent companies, which further limits the input of resources into any innovation activities of the automotive IJVs. This means that the automotive IJVs are essentially following the *Closed Innovation* paradigm, which is more restrictive than the *Open Innovation*

paradigm for building sound innovation capacity. Moreover, since a substantial gap generally exists between the technological capabilities of the Chinese automotive firms and the automotive MNCs, the limited transferred resources from the automotive MNCs cannot be optimally utilised in the collaborative innovation process. This can explain the fact that the innovation results are largely based on the existing products or technologies of the foreign party. In light of the explanations for the limited innovation performance, this research makes two contributions to the existing knowledge.

8.2.1: Ineffectiveness of IJVs to Drive Innovation

The current literature on IJVs revealed some features of the IJV that allow it to drive innovation activities and hence, take the IJV as an effective medium to drive innovation. For example, an IJV company is argued to drive innovation with the direct access to the resources of its parent companies. However, this research found that the current literature on IJV's capacity to drive innovation are rather simplistic. The theoretical arguments on IJV's capacity to drive innovation failed to properly consider the suggestions of innovation theories. There were some essential factors that have not been considered in evaluating the capacity of IJVs to drive innovation. For this reason, IJV literature cannot fully explain the real-life phenomenon.

By comparing the theoretical suggestion of innovation literature and the data analysis results, this research identified three underlying factors as the conditions of IJV-based innovation. These three factors are common strategic intent of parent companies on IJV-based innovation, free accessibility to resources of parent companies and external resources via collaborations, and matching capabilities of parent companies. This research found that IJVs can only drive innovation in an effective manner when the conditions are fulfilled. However, upon re-evaluating the features of the IJV partnership, this research found that these three conditions can hardly be met in general cases due to the nature of the IJV partnership. Therefore, it is inappropriate to generalise IJVs as effective mediums to drive innovation and instead, the IJV partnerships can often limit the potential innovation performance of the IJV company as demonstrated by the studied IJV cases.

The features of IJVs that limit innovation are considered by the current IJV literature in explaining other focus areas of research. Nevertheless, these features of IJVs have not been combined with innovation theories to reflect the overall effectiveness of an IJV as a medium for driving innovation, which is where the theoretical gap lies. For example, having common strategic goals between parent companies is considered by the IJV literature in evaluating the suitability of the IJV partners and consequently, the stability of the IJVs. Yet, the IJV literature should also recognise that having a common strategic goal on an IJV-based innovation will grant the IJV the strategic focus on innovation, which is one of the prerequisites of an innovation-friendly environment as suggested by innovation literature. This research contributes to the body of knowledge by combining the theoretical suggestions of both IJV literature and innovation literature and testing through real-life case studies.

8.2.2. A Revised Model of Knowledge Management in IJVs

Despite the IJV partnership's limitations on driving innovation, this research fully recognises that there can be circumstances where the IJV partnerships can effectively drive innovation, That is, if the underlying conditions of the IJV-based innovation are fulfilled. In light of this, this research also proposed a revised model of knowledge flow in the context of IJVs. The revised model was developed on the basis of the multi-stage model devised by Pak et al. (2015) and the underlying factors in the IJV-based innovation (common strategic intent, accessibility to external resources and matching capabilities). The newly proposed model provides a theoretical framework of the ideal scenario where an IJV can effectively drive innovation and consequently provide optimal reverse knowledge feedback effects.

The policy implication of these contributions to knowledge is that the IJV partnerships in the Chinese automotive industry should not be regarded as an effective way to enhance the indigenous innovation capacity of local firms in the automotive industry. Instead, the automotive IJV partnerships should be taken as an effective way to ensure the survival of local automotive firms. The successful experiences of ICM and some other local Chinese firms would suggest that the Chinese government should devise a policy to encourage the local automotive firms and relevant organisations, such as universities or other research institutes, to

establish an innovation network where numerous firms and organisations are collaboratively involved in innovation activities. This would allow the involved parties to follow the *Open Innovation* paradigm, which is argued by current literature to be highly efficient.

8.3. Limitations of this Research

The results of this research, as well as the contribution of this research, are entirely based on the case studies of three automotive IJVs and one independent automotive firm. Despite taking steps to select cases that are broadly representative of the Chinese automotive industry, the research results cannot be widely generalised to all IJVs and instead can only be generalised for the automotive IJVs in China.

The impact of both national and organisational culture on innovation is only accounted for in a limited sense in this research. The studied IJV cases were all established between Chinese companies and European companies. However, there are also other automotive MNCs that come from Asia and America that have different national cultures. The different national cultures can also impact the behaviour, such as the attitude to the relationship between the investment in innovation and its return. Additionally, the involved companies, both local and foreign, can have different organisational culture features. Both national and organisational culture can impact the IJVs cooperation and innovation processes, which consequently influences the IJVs innovation achievements. Therefore, companies with different national and organisational cultures can have different impacts on the innovation achievements within an IJV. This research focused on three IJVs between Chinese firms and European MNCs, and the results can only be considered applicable to other Chinese-European IJVs.

The impact of time on the innovation achievements of IJVs is also not accounted for in this research, beyond the observations made regarding the relative duration of the studied cases. This is because there is not enough data available that concerns the time effect on the studied IJVs. Evidently, the JV3 case has achieved a better innovation performance than JV1 and JV2 because of the delivery of architectural

innovation. JV3 was established long before JV1 and JV2; therefore, the length of IJV duration can potentially impact the improvement of the capabilities of local firms, which ultimately influences the IJVs' innovation performances. The case of JV1 and JV2 could therefore potentially achieve a similar innovation performance to JV3 given more time. Nevertheless, other automotive IJVs in China have successfully achieved a better innovation performance than JV1 and JV2 despite having been established only slightly earlier than JV1 and JV2. Furthermore, the ICM case evidently achieved a far superior innovation performance than any of the automotive IJVs in China within a similar time as JV1 and JV2, and in far less time than JV3. In this sense, although the duration of an IJV might affect its innovation performance, it does not seem to be the most fundamental factor in the IJVs' innovation activities. Yet it can have an impact on the learning and resource absorption process. The effect of time, therefore, requires further studies in the future to establish its significance in building innovation capacity.

Despite the anonymity afforded to participants in this research, the interviewees may have avoided expressing criticisms on their companies or the operational problems within their IJVs, as well as their parent companies. It is entirely possible that during the interview, the interviewees were being selective in answering the interview questions. This could cause inaccuracies in the results of this research with regard to what actually happened in the real world. To avoid this, the interview questions were designed to address the issues in various ways by asking a series of simple questions from a number of different perspectives. Additionally, the three cases have revealed a good degree of similarity in the answers to the questions, which to a large extent suggests their answers basically reflected reality.

Moreover, the research results are based on three IJV cases in which none of the foreign parties have shown a clear strategic intent on delivering innovation via IJVs, especially in terms of technological innovation. Consequently, there is a lack of strategic focus on innovation in the studied IJVs. This lack of strategic focus on innovation is taken as one of the explanations for the limited innovation performance of the studied IJVs. It is a common phenomenon in the automotive industry in China; therefore, the conclusion can be generally applied to automotive IJVs in China.

However, this research recognises that the research results could be rather different if the involved parties in an IJV show a common strategic intent on IJV-based innovation, especially in terms of technological innovation results. In such case, the IJV company will have a strategic focus on innovation and will potentially behave differently. Consequently, the effectiveness of an IJV as a vehicle for driving innovation must be reconsidered.

Lastly, the concerns regarding the protection of MNCs' IP in indicating IJV's capacity to drive innovation is not considered to a great extent in this research. This is primarily because, as illustrated by the studied IJV cases, it is a common phenomenon that the local parties of automotive IJVs are incapable of imitating advanced foreign technologies, especially the core technologies such as engine, transmission and chassis. Also, MNCs are required by the government to transfer some of their IP at certain stage of IJV operation regardless. However, this research fully recognises that the IP issue can have negative impact on the willingness of MNCs to engage in collaborative innovation activities in IJVs. This can be seen from two aspects – the concern of MNC over the leakage or misuse of their own IP; and/or MNC's concerns over the collaborative innovation outcomes achieved in their IJVs. In either case, MNCs are demotivated to share their IP that the use to ensure their competitiveness, which obstructs the collaborative innovation activities. It would require a great deal of mutual trust between local parties and MNCs, as well as a sound IPR protection mechanism in order for MNCs to be willing to share their resources and contribute to indigenous innovations. In fact, the IP issue in collaborative innovation activities is widely recognised by current literature. Though this has not been the case with the studied IJVs, the potential negative impacts of IP issue on IJV-based innovation are undeniable.

8.4. Future Research Recommendations

This research aimed to explore the reasons for the limited innovation performance of automotive IJVs in China. It was designed to focus on the factors derived from the current innovation theories (**F1–F3**) to maintain focus on these issues. Therefore, it

was necessary to set boundaries with respect to what the research design would cover. The limitations of this research, therefore, provide the basis for some recommendations for future research to better understand innovation behaviour in IJVs.

1. As this research specifically focuses on the automotive IJVs in China, the conclusions drawn can only explain the phenomenon in the automotive industry in China. Future research is recommended to explore the effectiveness of IJVs on developing innovation capacity in other industries in China or IJVs in other countries. The results of such research could help establish whether the same constraints that make IJVs less effective as innovation drivers could be applied more widely. This would also help make policy recommendations to the governments on encouraging IJVs to enhance indigenous innovation.

2. A large amount of research explores the relationship between the culture and innovation performance of an organisation (e.g. Mutairi et al., 2016; Desmarchelier and Fang, 2016). Yet the nature of IJVs means that innovation behaviour is rather complex because of the involvement of at least two companies with different national and organisational cultures. It is, therefore, worthwhile to look at the impact of culture on the innovation process in IJVs because the involvement of two national/organisational cultures in a single company can influence the innovation process, such as in the contribution of resources and innovation processes. This type of research can also be conducted using a qualitative case study research method over a number of selected IJV cases as this type of research also captures the understanding of complex social phenomena. The results of such research would improve the understanding of best/worst culture combination in future research on these focus areas. This can further improve the understanding of innovation behaviour in the context of IJVs, including what factors support or limit their innovation performance. Understanding innovation behaviour is important because international collaborations with MNCs, especially in the form of IJVs, are still encouraged or even required by governments in developing countries like China in order to achieve the objective of enhancing indigenous innovation capacity.

3. As taken as a limitation of this research, this research focuses on three IJVs in which

the involved parties do not show a common strategic focus on innovation. The IJV cases where both parties share a common strategic focus on innovation could generate different results. Therefore, future research is recommended to study IJV cases where both involved parties share a common strategic intent on IJV-based innovation. Preferably, the cases of IJVs where involved parties have similar technological capabilities. The results of such research can push the IJV theory forward by further examining the effectiveness of IJVs as innovation drivers.

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Appendices

Appendix 1:BSREC Approval

18th June 2015

Warwick Medical School

PRIVATE
Mr Hao Linghu
Flat 1524
Block E New Providence Wharf
London
E14 9PJ

Dear Mr Linghu,

Study Title and BSREC Reference: *Selective Innovation Concentration and Balance of Acquired Resources and Innovation Performance in Automotive IJVs in China* REGO-2015-1583

Thank you for submitting the above-named project to the University of Warwick Biomedical and Scientific Research Ethics Committee for research ethical review.

I am pleased to advise that research ethical approval is granted.

May I take this opportunity to wish you success with the study, and to remind you that any substantial amendments require approval from BSREC before they can be implemented. Please keep a copy of the original signed version of this letter with your study documentation.

Yours sincerely

P.P. Graham Hewitt

Professor Scott Weich
Chair
Biomedical and Scientific
Research Ethics Sub-Committee

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Appendix 2: Interview Questions for IJVs (Local Party)

Part 1: Business Strategy

Q1.1. International collaboration has been widely argued by the theoretical literature as an effective means to enhancing a firm's competitiveness. International joint venture (IJV), as a form of international collaboration, has been highly recommended by the Chinese government and is in fact strictly required in the automotive industry in China. Before you (you=your company) started the IJV with your current partner, what strategic factors did you focus on to ensure your future success?
Q1.2. Did you consider starting an IJV to be a means to implementing your strategy?
Q1.3. Are there any other purposes that the IJV is meant to serve?
- If yes, what are they?
Q1.4. How did you company come to form an IJV with the current IJV partner?

Part 2: Resources Accessibility

Q2.1. An IJV, with two (at least) parent company, is generally considered to be able to access more resources than an ordinary firm. Yet it is argued that the resources, which are needed to operate the IJV, can be different than an ordinary firm. Therefore, what kind of resources do you think are the most important to the IJV operation? And Why?
Q2.2. What kind of resource are you currently contributing to the IJV? What about

your IJV partner?
Q2.3. To what extend do you think resources complementarity is important to the IJV operation?
Q2.4. Do you think the resources that you and your IJV partner contributed to the IJV complement each other? To what extent do they do so?
Q2.5. What is the process by which you and your partner decide what resources to contribute to the IJV?

Part 3: Innovation Process

Q3.1. The resources of both parent companies, especially the technological resources have generally evolved during a long period of time in different ways and are therefore rather different. The existing literature state that the resources utilization can be a complex process. Could you generally describe how does your IJV company utilize the collaborative resources that are contributed by both parent companies? such as the foreign technology, local resources, or financial and personnel resources?
Q3.2. During the transfer of technology, is there any teaching or training provided by the foreign partner?
-If yes, how did they do it? -If yes, what content do these teaching and training normally cover? -If no, how do you normally understand and make use of the tech/exp/knowledge?

Q3.3.Have the technology, knowledge and experience transferred to the IJV ever been modified to adapt to the local environment? If yes, can you give me an example?
If yes: -Did you and your partner modify it collaboratively? And how? -Could you generally describe the resources evolution process? -Is the Chinese partner's local knowledge the key to such adaptation? Or it is a collaborative effort?
Q3.4. When there have been any technical issues with the adaptation of transferred technology, do you put together a project team that involves personnel from both parent companies to resolve them? Or does one partner takes the responsibility and resolves it independently? Example?

Part 4: Motivation Factors

Q4.1.1. A large majority of existing literature suggests that international collaborations, especially IJVs, can enhance the innovation capacity of not only the IJV company, but also the parent companies themselves. It also reflects the Chinese government's insistence on IJVs. Therefore, do you consider innovation capacity building as one of the strategic focus in the IJV operation?
Q4.1.2.How do you see the importance of the IJV innovation in being competitive in the market of China? now and in longer term?

Q4.1.3. How do you balance the cost and return of innovation activities in China?
Q4.1.4.: How do you see the influences that the foreign technology have on the improvement of your existing technology? Can you give me an example?
Q4.1.5. How long do you think you it will take before you can compete independently against foreign firms? in both the Chinese and global market?

Part 5: Inter-Partner Relationships

Q4.2.1. When you were starting the IJV, did you set clear boundaries to the responsibilities between the two partners? For example, the foreign partner is in charge of A, B, C and the you are in charge of D, E, F?
-If yes, roughly who's in charge of what area? And why? -If no, How does the collaborative relationship work?
Q4.2.2. What is the decision making process of the IJV top management?
Q4.2.3. Has there ever been any disagreement between you and your current IJV partner?
-If yes, would it be possible if you can roughly say something about which part of the business does the disagreement normally happen? -How do you resolve the disagreement?
Q4.2.4. How do you and your IJV partner develop new technology or product

collaboratively?
-What area do such collaborative activities focus on?
Q4.2.5. Have the operation processes of IJV ever delivered unexpected benefits beyond what was originally intended? Such as the improvement to existing technology?
-If yes, what are they? -Which parts of the operation yield such result?

Part 6: Progress of Innovation

Q5.1. Already we can see a lot of innovative changes that were made to the existing foreign models in China. It is perhaps like the theories say that the IJV collaborations do effectively improve the innovation capability. So, how do you rate your IJV's current capability to innovate, relative to global competition? Would you say 'you have long way to go' or 'you're getting there' or 'you've caught up' or simply 'you're ahead of the competition'?
Q5.2. Could you briefly conclude the innovation performance achieved by the IJV itself?
-How many of them are the direct result of the IJV itself? -How many of them are the collaborative project?
Q5.3. In general, have you ever improved your own products or generate new products or technology based on the understanding of the transferred foreign technology?
-If yes, can you give me an example?

-How often does it happen?
Q5.4. What is the innovation strategy for the long run? for IJV and the local mother company

Final Question: IJVs are argued to be able to enhance innovation capacity by the theoretical literature. Therefore, despite the resources that have been accessible to you and the innovation achievement you have made so far, what kind of resources do you ideally need to achieve a greater innovation performance? and why?

Appendix 3: Interview Questions for IJVs (Foreign Party)

Part 1: Business Strategy

Q1.1. International collaboration has been widely argued by the theoretical literature as an effective means to enhancing a firm's competitiveness. International joint venture (IJV), as a form of international collaboration, has been highly recommended by the Chinese government and is in fact strictly required in the automotive industry in China. What is your main reason for starting an IJV in China?
Q1.2. Are there any other purposes that the IJV is meant to serve?
- If yes, what are they?
Q1.3. How did you company come to form an IJV with the current IJV partner?

Part 2: Resources Accessibility

Q2.1. An IJV, with two (at least) parent companies, is generally considered to be able to access more resources than an ordinary firm. Yet it is argued that the resources, which are needed to operate the IJV, can be different than an ordinary firm. Therefore, what kind of resources do you think are the most important to the IJV operation? And Why?
Q2.2. What kind of resource are you currently contributing to the IJV? What about your IJV partner?
Q2.3. How do you see the importance of resources complementarity in the IJV operation?

Q2.4. Do you think the resources that have been contributed by you and your partner to the IJV complement each other? To what extent did they do so?
Q2.5. What is the process by which you and your partner decide what resources to contribute to the IJV?

Part 3: Innovation Process

Q3.1. The resources of both parent companies, especially the technological resources have generally evolved during a long period of time in different ways and are therefore rather different. The existing literature state that the resources utilization can be a complex process. Could you generally describe how does your IJV company utilize the collaborative resources that are contributed by both parent companies? Such as the foreign technology, local resources, or financial and personnel resources?
Q3.2. During the transfer of technology, did you provide any teaching or training?
-If yes, how did you do it? -If yes, what content do these teaching and training normally cover?
Q3.3.Has the technology, knowledge and experience transferred to the IJV ever been modified to adapt the local environment? If yes, can you give me an example?
If yes: -Did you and your partner modify it collaboratively? And how? -Could you generally describe the resources evolution process? -Is the Chinese partner's local knowledge the key to such adaptation? Or it is a

collaborative effort?
Q3.4. When there have been been any technical issues with the adaptation of transferred technology, do you put together a project team that involves personnel from both parent companies to resolve them? Or does one partner takes the responsibility and resolves it independently? Example?

Part 4: Motivation Factors

Q4.1.1. A large majority of existing literature suggests that international collaborations especially IJVs can enhance the innovation capacity of not only the IJV company, but also the parent companies themselves. It also reflects Chinese government's insistence of IJVs. Therefore, do you consider innovation capacity building as one of the strategic focus in the IJV operation?
Q4.1.2. Other than adapting to the local market, have you ever used the local knowledge to improve your existing technology? Can you give me an example?
Q4.1.3. Is the benefit of transferring your technology to the IJV worth its risk?
Q4.1.4.: How do you manage such risk and balance its benefit?
Q4.1.5. How much do you think your IJV partner has learned from you in the collaboration so far?
Q4.1.6. Does this raise any opportunities or concerns? And why?

Part 5: Inter-Partner Relationships

Q4.2.1. When you were starting the IJV, did you set clear boundaries to the responsibilities between two partners? For example, the Chinese partner is in charge of A, B, C and the you are in charge of D, E, F?
-If yes, roughly who's in charge of what area? And why? -If no, in which area do you work collaboratively?
Q4.2.2. What is the decision making process of the IJV top management?
Q4.2.3. Has there ever been any disagreement between you and your current IJV partner?
-If yes, would it be possible if you can roughly say something about which part of the business does the disagreement normally happen? -How do you resolve the disagreement?
Q4.2.4. How do you and your IJV partner develop new technology or product collaboratively?
If yes, what areas do such collaborative activities focus on?
Q4.2.5. Have the operation processes of the IJV ever delivered unexpected benefits beyond what was originally intended? Such as the improvement to existing technology?
-If yes, what are they? -Which parts of the operation yield such result?

Part 6: Progress of Innovation

Q5.1. Already we can see a lot of innovative changes that were made to the existing foreign models in China. It is perhaps like the theories say that the IJV collaborations do effectively improve the innovation capability. So, how do you rate your IJV's current capability to innovate, relative to global competition? Would you say 'you have long way to go' or 'you're getting there' or 'you've caught up' or simply 'you're ahead of the competition'?
Q5.2. Could you briefly conclude what innovation performance has been achieved by the IJV itself?
-How many of them are the direct result of the IJV itself? -How many of them are the collaborative project?
Q5.3. In general, have you ever improved your own products or generated new products/tech based on the understanding of local knowledge?
-If yes, can you give me an example? -How often does it happen?
Q5.4. What is the innovation strategy for the IJV company?

Finally, it is clear that the local Chinese automotive firms have been developing themselves at a good speed especially with the help from IJV partners like your company. How long do you foresee the IJV continuing into the future – 5-10yrs, 10-15yrs, 15-20yrs, and why?

Appendix 4: Interview Questions for ICM

Part 1: Business Strategy of ICM

Q1.1. ICM has been widely acknowledged as a world-class innovator. Your innovation achievements especially the development of the electric vehicle technology has been exclusively commented to be highly advanced. So in the early stages of your company, what strategic factors did you focus on to ensure your business success in both Chinese and global market?
Q1.2. Has your strategic focus ever changed over time? And why?
Q1.3. Do you consider innovation to be a strategic priority in your business operation? And why?
Q1.4. How do you see the significance of innovation in building up your competitiveness in China or globally?
Q1.5. How do you justify the balance between cost on innovation and its return?
Q1.6. Are there any external forces that particularly drive the innovation activities?
If yes, what are they? How do they push you? If no, did you entirely drive your innovation on your own?

Part 2: The Significance of Resources

Q2.1. What kind of resources do you think are important to implement your business

strategy? And why?
Q2.2. The existing theoretical literature suggest that resources, including financial resources, managerial resources and technological resources are the keys to build up innovation capacity. To what extent do you agree or disagree with this?
Q2.3. For a company like ICM which started innovating from scratch, what kind of resources do you think is the most important to effectively start innovating?
Q2.4. What kinds of resources were accessible to you in your initial stages?
Q2.5. How did you utilize them to build up innovation capacity? Example?
Q2.6. What do you think are the key initial stages of the innovation process?
Q2.7. Did you ever modify your existing or newly developed technology? Can you give me an example?-
Q2.8. What was the main reason for the modification?
Q2.9. It is also widely argued in the academic world that actively sourcing external resources can, to a large extent enhance and accelerate innovation performance. Thus, I'm wondering, do you make use of external resources/collaboration to further build up your innovation capacity? such as strategic alliance? or licensing agreement? or any research networks? or anything else?

Q2.10. If there are any, what are they? What do these external resources/collaborations enable you to achieve?
Q2.11. Do these resources have a role in your innovation achievements? Example?
Q2.12. Can you give me an example of how newly acquired technology has been applied to the production or operation?
Q2.13. Have you ever modified any of your acquired knowledge to better adapt to the environment of Chinese automotive industry or the circumstances of your company? Can you give me an example?

Part 3: The Innovation Strategy of ICM

Q3.1. The industrial observation suggests that, despite the external resources you have probably utilized, you are innovating largely on your own capabilities. How do you see your high efficiency in generating innovation?
Q3.2. Do you have any special business or innovation models for innovation capacity building? If yes and it is not so sensitive, could you please generally describe how does it actually work?
Q3.3. Most of the companies, which seek to enhance innovation capacity, provide training especially for the key technical personnel such as engineers. Do you have such a process? How does it work? To what extent does it play a role in your innovation achievements?

Final Question: It is understandable that a lot of factors are combined to allow you such great innovation achievements. The questions I asked before might not be enough to cover the entire story of your innovation capacity building process. Therefore, could you please enlighten me something else that I need to be aware of for the purpose of firm innovation study?

Appendix 5: Interview Questions for Industrial Experts

Part 1: Indigenous Innovation in China.

Q1.1. The concept of 'indigenous innovation' has been talked about for a few years. It is also clearly stated as one of the major government responsibilities in the 12th 5-year plan. How significant do you think innovation is in the automotive industry in China?
Q1.2. What kind of action does the government take to push the innovation activities?
Q1.3. According to your observation, how important do the car makers in China think innovation is?
Q1.4. What are the truly indigenous innovation achievements in automotive industry so far?
Q1.5. How long do you think it will take before they can truly compete with the international car makers in terms of innovation capacity? What will it take to achieve this?

Part 2: Collaboration with Multinational Corporations

Q2.1. Collaboration with foreign car makers are strongly recommended by the government in the Chinese automotive industry. IJV is in fact strictly required by the government if foreign car makers wish to start production in China. Overall, how do you see the significance of IJVs with foreign car makers in Chinese automotive industry?

Q2.2. How much do the foreign car makers contribute in terms of resources to the IJVs ? such as technology, experience, and knowledge.
Q2.3. To what extent do you think these resources influence indigenous innovation? And why?
Q2.4. According to your observation, how do the local Chinese car makers actually utilise the resources to engage in innovation activities? And what are their innovation achievements?
Q2.5. The foreign car makers surely offered a certain amount of technology and knowledge as well as some trainings and education for the local car makers. But what kind of resources do the local automotive firms ideally need to better innovate?

Part 3: Innovation in Chinese Automotive Industry

Q3.1. Industrial observation suggests that the current Chinese automotive IJVs heavily focus on incremental innovation and according to existing theory about access to resources, Chinese automotive IJVs should be highly innovative, how do you see this?
Q3.2. Are there any barriers or demotivation factors?
Q3.3. As we know, the idea of requiring an IJV is to allow the local firm to learn from the foreign automotive firms in order to ultimately achieve indigenous innovation.

How do you see the effectiveness of such process?
Q3.4. The local car makers especially those with an IJV partner, have introduced a lot of indigenous models equipped with fairly new technology. How do you see the impact that their foreign partners have on them?
Q3.5. How do you see the balance between the cost of innovation and its return in the automotive industry in China?
Q3.6.How do you see the fact that, ICM as an independent car maker, has managed to deliver innovation without forming an IJV?
Q3.7. How do you rate their innovation performance, relative to the Chinese automotive industry as a whole?
Q3.8. How do you think they have achieved such innovation performance? Is it the resources utilization process that allows ICM to achieve it? Or what is the main reason for this?

Finally, with regard to the whole issue of the development of the Chinese automotive industry, can you think of anything else from your experience that I should be aware of for the purposes of this study?

Appendix 6: Consent Form

Study Number: REGO-2015-1583

Title of Project: An Investigation on the Limited innovation in the Automotive International Joint Venture in China

Name of Researcher(s): Hao Linghu, Supervised by Dr Tina Barnes

Please initial all boxes

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason ☐
3. I agree to record the interview. ☐
4. I understand that I am free to stop the recording at any time without needing to give any reason. ☐
5. I agree to take part in the above study. ☐

Name of Participant	Date	Signature
Name of Person taking consent	Date	Signature

Appendix 7: Participant Information Leaflet

Study Title:	**Investigation on the Limited innovation in the Automotive International Joint Venture in China**
Investigator(s):	**Hao Linghu**

Introduction

You are invited to take part in a research study. Before you decide, you need to understand why the research is being done and what it would involve for you. Please take the time to read the following information carefully.

(Part 1 tells you the purpose of the study and what will involve if you take part. Part 2 gives you more detailed information about the conduct of the study)

Please ask me if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

PART 1

What is the study about?

To explore the main factors that can accelerate the innovation performance of automotive IJVs in China.

Do I have to take part?

It is entirely up to you to decide. I will describe the study and go through this information sheet, which I will give you to keep. If you choose to participate, I will ask you to sign a interview form to confirm that you have agreed to take

part. If you would prefer to participate via email instead of telephone or face-to-face interview, you will be giving your consent by supplying that information and a formal consent form will not therefore be needed in this case. You will be free to withdraw at any time regardless of interview form, without giving a reason and this will not affect you or your circumstances in any way.

What will happen to me if I take part?

You will be asked a number of questions and expected to give answers to these questions based on what the your own thinking on the matter. The interview can take up to 40 minutes but can be flexible if the you prefer it shorter.

What topics will this study cover?

The study is designed to explore the underlying factors that can potentially enhance the innovation capacity of an automotive IJVs in China as well as their parent companies. Therefore, this study will cover a certain amount of managerial knowledge of IJVs as well as the automotive industry in China.

What are the possible benefits of taking part in this study?

The participants, namely your company and your automotive IJVs, will benefit from receiving a report of the findings of this research as well as in involvement in a critical discussion of the conceptual outcomes that are expected to be emerged during the study. For example, you can expect to see a more developed innovation models and potentially a diagnostic tool that can be used to support the innovation structure of your company.

Will my participation cost me anything?

The purpose of this study is purely for theoretical research, thus there will be no cost to you.

What will happen when the study ends?

I will analyse the data based on the understanding of existing theory in order to get a improved innovation framework of IJVs. The raw data, when the study ends, will be transferred from my PC to portable memory device in a password-protected digital file format. According to rules of the University of Warwick, the memory device would be would be kept inaccessible for at least 10 years by locking it in a safe in the office of the researcher's supervisor in IMC building, Warwick University.

Will my taking part be kept confidential?

Yes. I will follow strict ethical and legal practice and all information about you will be handled in confidence. Further details are included in Part 2.

Will the interview be recorded?

I will ask your permission first. If you feel comfortable to allow me to record the interview, I will use my own audio-recording device to do so. You will be given the right to stop the recording anytime you wish without needing to show a reason. After the interview is over, if you feel uncomfortable with some parts of the recording, I will edit it out for you immediately.

What if there is a problem?

Any complaint about the way you have been dealt with during the study or any possible harm that you might suffer will be addressed. Detailed information is given in Part 2.

This concludes Part 1.

If the information in Part 1 has interested you and you are considering participation, please read the additional information in Part 2 before making any decision.

PART 2

Who is organising and funding the study?

The study is organised by me and my supervisor. The study is entirely funded by myself.

What will happen if I don't want to carry on being part of the study?

Participation in this study is entirely voluntary.Refusal to participate will not affect you in any way. If you decide to take part in the study, you will need to sign a consent form, which states that you have given your consent to participate.

If you agree to participate, you may nevertheless withdraw from the study at any time without affecting you in any way.

You have the right to withdraw from the study completely and decline any further contact by study staff after you withdraw.

What if there is a problem?

This study is covered by the University of Warwick's insurance and indemnity cover. If you have an issue, please contact the Chief Investigator of the study:

Jo Horsburgh

J.Horsburgh@warwick.ac.uk

Or my research supervisor

Dr Tina Barnes

T.A.Barnes@warwick.ac.uk

Who should I contact if I wish to make a complaint?

Any complaint about the way you have been dealt with during the study or any possible harm you might have suffered will be addressed. Please address your complaint to the person below, who is a senior University of Warwick official entirely independent of this study:

Director of Delivery Assurance

Registrar's Office

University House

University of Warwick

Coventry

CV4 8UW

Complaints@Warwick.ac.uk

024 7657 4774

Will my taking part be kept confidential?

The data gained participants will be kept confidential. Your participation will be totally anonymised including your name and any other information that can be possibly used to identify you. Your company will be generally described (e.g. Company A - An automotive IJV between a Chinese car manufacturer and an European car manufacturer; Company B - An independent Chinese car manufacturer). Yet in order to ensure the credibility of the study, your nature of work will be generally described if you permit (e.g. senior manager with responsibility for strategic R&D research). The raw data (e.g. the interview transcripts) will not appear in the final PhD thesis. After the study ends, the raw data, including the recordings, the interview transcripts is going to be removed from the researcher's PC/Laptop andtransferred in a locked portable memory devices in a password-protected digital file format that is inaccessible to any other person other than me.

What will happen to the results of the study?

You are given the opportunity to, at anytime, request a copy of this study and make use of the study results in real life practice, I would also be willing to make presentations. In order to ensure confidentiality, no material relating to the raw data collected from this interview is going to be published in any journals or conference papers without letting you to first review the draft and give your approval.

Who has reviewed the study?

This study has been reviewed and approved by the University of Warwick's Biomedical and Scientific Research Ethics Committee (BSREC)

What if I want more information about the study?

If you have any questions about any aspect of the study, or your participation in it, not answered by this participant information leaflet, please contact:

Hao Linghu

+44 7472712839

H.Linghu@warwick.ac.uk

Dr Tina Barnes

T.A.Barnes@warwick.ac.uk

Thank you for taking the time to read this participant information leaflet.